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Visitor Perceptions of Campsite Impact Acceptability

Stephen F. McCool

Steven R. Martin

Report Submitted to U.S.D.A. Forest Service

Intermountain Research Station

Wilderness Management Research Unit

Missoula, MT

March 31, 1987

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ABSTRACT

Human-induced impacts from recreational use of wilderness continue to be a significant management challenge, threatening both the integrity of the wilderness resource and the quality of visitor experiences. Campsite impacts in particular are a major concern to wilderness managers.

A current approach to this problem is the Limits of Acceptable Change (LAC) Planning System, which focuses attention on the question, "How much change in wilderness conditions is acceptable?" The LAC process includes, as one of its major components, the specification of acceptable conditions defined by a series of measurable parameters. While a considerable amount of ecological research has helped establish the appropriateness of various biophysical indicators, defining the acceptable level of change in those indicators is difficult.

Past research has shown that managers and visitors often perceive resource conditions differently. But managers need to understand how visitors perceive campsite impacts in order to set standards that are understood by and acceptable to visitors.

The research reported here involved a series of experiments, each designed to investigate a different aspect of visitor perceptions of campsite impacts. A set of slides produced from color illustrations was used to portray impacted campsites. Illustrations were used in order to control extraneous factors such as scenic and functional attributes of the site. They also allowed for complete control over the type and level of impact present.

The slides were shown to wilderness user groups, and to forestry and recreation management students at the University of Montana. Varying levels of bare ground, tree damage, and fire ring impact were portrayed, and respondents evaluated the acceptability of the campsite conditions in each case. Potential standards were then determined based on those evaluations.

Additional experiments investigated 1) the relative importance of the three impacts; 2) whether wilderness visitors evaluated campsite conditions in the

wilderness interior differently from those in the periphery; 3) the extent to which perceived amount of impact correlated with the acceptability of conditions; 4) whether visitors might be willing to give up more scenic campsites for less scenic sites that are in better shape; and 5) the effect that independent variables such as amount of experience, travel method, and purist attitudes have on perceptions and evaluations of campsite impacts.

Findings show a clear rationale for using bare ground as an indicator to monitor wilderness conditions. Some support was found for the concept of a Recreational Opportunity Spectrum in wilderness. A significant difference was found between desirability and acceptability of campsite conditions. Attitudes and beliefs toward wilderness were found to have significant and consistent effects on perceptions and evaluations of campsite impacts. Some support was found for the notion that visitors may prefer less-impacted campsites to more scenic but impacted sites. Management implications are discussed.

Keywords: wilderness visitors, campsite impacts, visitor perceptions, Limits of Acceptable Change (LAC)

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INTRODUCTION

Problem Definition

When European settlers first began to arrive on the shores of America they were faced with a continent that, although described by earlier explorers as "good ground" and "fruitful land" (Carroll 1979), was also viewed as both a threat to their safety and survival and a barrier to the expansion of European civilization in the New World. As the westward expansion marched toward the Pacific, vast areas of wilderness were transformed and subdued in its wake. Only after the amount of wild land had noticeably decreased did it begin to assume value. What a progression of thought occurred between the time the first settlers arrived on the doorstep of a "hideous and desolate wilderness", howling and dismal (Nash 1982) and the turn of the century when John Muir wrote "in God's wildness lies the hope of the world - the great fresh, unblighted, unredeemed wilderness" (Teale 1954).

As civilization continued to swallow previously untamed land and wilderness became scarcer, a number of individuals began to promote the idea of preserving some areas in their natural state. Henry David Thoreau, George Catlin, Washington Irving, Samuel Hammond, George Perkins Marsh, and others argued the case for wilderness preservation. In 1872 over two million acres of land were set aside as the world's first National Park, though "only later did a few persons begin to realize that one of the most significant results of the establishment of the first national park had been the preservation of wilderness" (Nash 1982).

Two generations later, following the era of John Muir, Gifford Pinchot, Teddy Roosevelt, and the setting aside of millions of acres of forest preserves, the "first application of the preservation principle to the National Forests" was made: Arthur Carhart convinced his superiors in the Forest Service to designate Trappers Lake in Colorado as a roadless and undeveloped area in 1920 (Nash 1982). Four years later over 500,000 acres of the Gila National Forest were designated as wilderness due to the efforts of Aldo Leopold, and wilderness preservation of National Forest land began in earnest.

This movement to preserve Federal land as wilderness, led by men such as Bob

Marshall and Howard Zahniser, culminated in 1964 with the passage of the Wilderness Act; but unlike an earlier time when mere designation was adequate to protect the natural qualities of these areas, a more active management role is necessary today. George Marshall (1969) realized this when he wrote "At the same time that wilderness boundaries are being established and protected by Acts of Congress, attention must be given to the quality of wilderness within these boundaries, or we may be preserving empty shells."

Wilderness Management

Although managing wilderness might seem an incongruity or a paradox, what is actually meant by the term is managing the human use of and influence on the wilderness (Hendee, Stankey, and Lucas 1978). The primary goals of wilderness management are to maintain the free operation of natural processes and to preserve qualities such as wildness and solitude. The Wilderness Act states that wilderness areas "shall be administered for the use and enjoyment of the American people in such manner as will leave them unimpaired for future use and enjoyment as wilderness" (Public Law 88-577). Thus wilderness managers are faced with the difficult task of managing an area of land governed by two major objectives which are, to some extent, at odds with each other: 1) providing for use and enjoyment of the area by people, and 2) preserving the area's natural conditions and primitive qualities.

The difficulty lies in the fact that recreational use inevitably results in changes to ecological (Cole 1981; 1982) and social conditions. And although use of wilderness areas seems to be leveling off (Stankey and Lucas 1986), it remains high enough that concern has been expressed by managers and users alike that some areas have exceeded appropriate use levels. Washburne and Cole (1983) found that 65 percent of the wilderness managers responding (representing 249 areas) reported that use levels 'sometimes' or 'usually' exceeded capacity in at least some portions of their areas. For the most part, wilderness managers and researchers have been unable to completely address this concern; much of the difficulty has been the lack of both a clear understanding of recreational carrying capacity, and an appropriate method for determining it.

The solution to this issue is not only important for improved management of wilderness, but is also mandated by law. The Wilderness Act states that an agency "administering any area designated as wilderness shall be responsible for preserving the wilderness character of the area" (Public Law 88-577), while the National Forest Management Act (NFMA) directs managers to limit use to levels that will not impair the values for which the wilderness area was designated (Federal Register 1982). But these values are threatened by many factors. Activities outside Wilderness boundaries can result in air and water pollution or visual impacts that may affect wilderness users (Stankey et al. 1985), and recreational use results in ecological changes within the wilderness.

Resource Impacts

Human-induced impacts resulting from recreational use continue to be a significant management challenge, threatening the integrity of both the wilderness resource and the quality of visitor experiences. Questions related to visitor-caused impacts have been posed for years, typically taking the same form -- how much use is too much? But studies have generally found no clear or predictable linear relationship between level of use and the resulting environmental conditions because of intervening factors such as type, timing, and distribution of use, knowledge and behavior of users, and susceptibility or resistance of the site to impact (Frissell and Duncan, 1965; Cole, 1982, 1985a; Cole and Fichtler, 1983). Nor has a predictable curvilinear relationship been found that would indicate a 'land intrinsic' carrying capacity.

Impacts resulting from recreational use, particularly at campsites, are a major source of concern to wilderness managers. A recent study by Washburne and Cole (1983) found that the managers of 77 percent of all National Forest Wilderness and Primitive areas considered human-caused vegetation impacts at campsites a problem, and managers of 71 percent of these areas considered human-caused soil impacts at campsites a problem, more than for any other recreation-caused impact or problem. Lucas (1980a) states that "knowledge about acceptable impacts is most critical for campsites", and points out that much effort goes into managing campsite impacts and use, at least some of which seems to

be "based on assumed visitor perceptions and evaluations of campsite impacts" for which adequate knowledge or support does not exist. Indeed, he states that some management efforts such as removing certain impacts (fire rings for example) or attempting to shift camping patterns are debatable, and goes on to state that "a clearer understanding of visitor perceptions could help put such policies on a sounder foundation, help determine the relative priority management of campsite impacts should receive, . . . and help judge the cost/benefit relation of restrictive regulation of campers" (Lucas 1980a).

Rules and regulations regarding visitor use are a common response to management concern over campsite impacts, but "such measures can severely conflict with the experiences that visitors seek and may easily jeopardize visitor feelings of freedom and spontaneity" (Lucas et al. 1985). It is clear that users are extremely sensitive to management control of campsite use -- Stankey (1973) found that assigned campsites were the least favored method of use control among wilderness users -- and that without the necessary knowledge "well-intentioned actions to control one type of problem might replace it with an even more serious one (Lucas et al. 1985).

Limits of Acceptable Change

A current approach to dealing with the problem of human-induced change in wilderness is the Limits of Acceptable Change Planning System (LAC). As its name suggests, the LAC approach concerns itself not with determining a permissible number of people, but with identifying "where, and to what extent, varying degrees of change are appropriate and acceptable. In summary, the process requires deciding what kind of wilderness conditions are acceptable, then prescribing actions to protect or achieve those conditions" (Stankey et al. 1985). The first of four major components in the LAC process is the "specification of acceptable and achievable resource and social conditions, defined by a series of measurable parameters" (Stankey et al. 1985). The traditional recreational carrying capacity question of "how much use is too much?" is redefined to ask "how much change in conditions is acceptable?" Focusing on this question directs management attention away from numbers of users and toward management for desired social and ecological conditions (Stankey et al. 1984).

Selecting indicators and setting standards of acceptability is the heart of the LAC process. Indicators should be specific variables or elements of a setting that reflect resource and social conditions, such as bare ground at a campsite or encounters with other parties on the trail. In a study using the Delphi technique to identify potential indicators, Merigliano and Krumpe (n.d.) listed a number of criteria useful in evaluating indicators, including long and short term significance, responsiveness to management action, sensitivity to wildness, feasibility of field measurement, reliability, correlation with human use, ability to detect amount of change, and expense.

After indicators are chosen, standards are set. Standards are quantitative or otherwise highly specific measures that are assigned to the chosen indicators -- the measurable aspects of the indicators (Stankey et al. 1985). Standards are set using information collected during an inventory of existing conditions, along with professional judgement and public input, but standards should not simply imitate the current conditions. By comparing standards with existing conditions managers can identify places where management action is needed to restore conditions to the desired level.

Standards should be set so as to improve conditions, but should also be realistic and achievable. Setting very high, or strict, standards may look good on paper, but will do no good if they are so high as to be unattainable. And while a range of standards can be set in order to provide a diversity of wilderness opportunities, at no time should standards be set that would allow conditions to deteriorate below levels deemed acceptable or appropriate in light of the area's legal designation as wilderness.

Setting standards is possibly the most crucial step in the LAC process, for these standards define the "limits of acceptable change", and determine the future character of the area.

Defining Acceptability

Now the critical question arises -- what constitutes 'acceptable'? Defining acceptability is ultimately a personal judgement, so whose definition do we use? Several studies (Lucas 1970, Hendee and Pyle 1971, Peterson 1974) have shown that managers' and users' perceptions of resource conditions can be quite different. These differences can be attributed to the different perspectives from which they are viewing the resource. Lucas (1979) points out some of the influences that affect managers' and users' perceptions of resource impacts: 1) managers have a professional responsibility to the resource, while a visitor's relationship to the resource is based on its aesthetic value; 2) managers are usually trained in the natural sciences and tend to observe an area in terms of its natural processes, while users normally do not have such a background and have a limited awareness of such processes; 3) managers have often had the chance to observe an area over a relatively long period of time, and tend to take a longer-term view of changes to the area, while visitors are usually less experienced in the area and do not hold a strong future orientation. Hendee and Pyle (1971) also point out that the wilderness is a work environment to managers, while it is a recreational environment to users.

It seems fair that neither the managers' nor the visitors' views should be used as the sole determinant in defining acceptability. But the fact that users' views are important is obvious, for wilderness carrying capacity is, in part, defined as "the ability of an area to provide the visitor with a satisfactory wilderness experience" (emphasis added; Stankey 1971).

Problem Statement

Among the most prevalent human-induced impacts at wilderness campsites are barren ground, tree damage, and fire rings. These impacts not only have the potential to affect the quality of visitor experiences, but also can result in long term ecological damage to the resource (within the boundaries of the disturbed area). Lucas, in unpublished data collected in 1982, found that 28 percent of overnight visitors to the Bob Marshall Wilderness Complex rejected a campsite because of its condition. Cole (1985b) states that "proliferation of campsite impacts and excessive deterioration of campsites seriously compromise wilderness goals", and adds that "the most serious problem is one of visual impact; conspicuous evidence of human impact is almost everywhere" at campsites.

Understanding how visitors perceive campsite impacts, and how such impacts influence a camper's choice, use of, and satisfaction with a campsite is extremely important if managers are to make intelligent decisions concerning the management of wilderness campsites. As the relatively new Limits of Acceptable Change Planning System is applied to wilderness management situations, more knowledge about visitor perceptions of impacts will be needed in order to determine the appropriate and acceptable resource conditions for wilderness areas.

This study will attempt to answer the questions: What are the limits of acceptable change or standards of acceptability for certain campsite impacts as perceived by visitors?; do those limits or standards vary according to the location of the campsite within a wilderness area?; and do those limits or standards vary according to particular user characteristics?

Objectives

The goals of this study are to achieve a better understanding of visitor perceptions of campsite impacts in wilderness settings, and to determine potential limits of acceptability for such impacts based on those perceptions. Specifically, the research objectives are to:

1) Determine the relative importance of certain campsite impacts based on visitor evaluations of varying campsite conditions.

2) Develop potential evaluative standards of acceptability for the impacts based on those evaluations.

3) Compare acceptability standards for different 'opportunity zones' within a wilderness.

4) Determine how the above evaluations and standards differ between groups of users possessing different wilderness value orientations, differing levels of experience, and travelling by different methods.

5) Compare and contrast the above evaluations and standards of visitors with those of wilderness managers.

CONCEPTUAL FRAMEWORK

People recreate in order to realize certain experiences or outcomes. These desired outcomes vary from person to person, from activity to activity, and from one setting to another. People recreate for various reasons, and are satisfied in different ways and by different settings. Likewise, settings vary in the combinations of attributes they possess, in the opportunities they present, and thus in their ability to produce satisfactory recreational engagements. Whether or not a particular setting satisfies a certain recreationist depends on many factors, including how certain attributes of that setting compare with the person's internalized standards; how those attributes affect realization of desired outcomes; the saliency of those desired outcomes; the person's motivations for recreating; and their experience expectations. The latter four of these factors also serve as a basis for a person's internalized normative standard used for evaluating a particular attribute, as well as affecting how a person perceives the attributes or conditions of a particular location or setting.

Over time people come to define for themselves internalized standards for attributes that are important to them – attributes that may affect the realization of desired outcomes, and therefore satisfaction with their engagement. This internalized standard may be expressed as a personal norm, or range of acceptability, for a certain attribute. These norms, or acceptability standards, will be different for different attributes and settings, and will vary among recreationists (and even within a person over time). Acceptability standards for attributes will vary among recreationists because of the factors cited earlier: different motivations, expectations, desired outcomes, and importance attached to certain attributes.

While it would be interesting to measure all of the previously mentioned factors for the respondents in this study, doing so would expand the scope of the project well beyond the time and financial constraints imposed. Therefore, instead of specifically measuring each person's motivations, expectations, desired outcomes, and importance attached to certain attributes, a single measure that would encompass these factors was needed. A wilderness purism scale, modified from

Stankey (1971), was chosen to measure respondents' attitudes and beliefs toward wilderness.

A Wilderness Purism Typology

It is widely recognized that recreationists display a range of responses to particular situations and circumstances (in both the social and ecological environment), just as they vary in their reasons for recreating. Graefe et al. (1984) note that based on this recognition of the "diverse, multidimensional nature of desires found among recreationists, many researchers have differentiated users into more homogeneous subgroups."

As both Stankey (1971) and Schreyer (1976) point out, maximizing the benefits derived from a finite wilderness resource can be approached two ways: you can try to please all the people all the time, which Schreyer refers to as the "lowest common denominator" approach; or you can define a particular type of experience for which to manage an area. The former approach (LCD) has many shortcomings, the most glaring of which is that when you try to please everyone all the time what usually happens is that no one is satisfied. The LCD approach manages for quantity instead of for quality.

The second approach, which Schreyer terms selective experience management, involves selecting a set of experiences most suitable for an area, then managing to provide the opportunities necessary for visitors to engage in activities that might lead to that particular type of experience. As Schreyer points out, this is what is being done on a large scale through the establishment of Wilderness areas.

Once a particular type of experience is selected for an area, "those persons who are directly concerned with seeking that kind of experience become the group of persons who should have the greatest say in determining criteria for management of the area" (Schreyer 1976). Schreyer labels this group of people the area's primary management clientele (PMC).

When managing an area to provide the opportunity for a wilderness type of experience, which users should managers listen to? It is known that there is a

wide range of values, orientations, and perceptions held by wilderness users. Schreyer points out that "Given the diversity of human perceptions, not to mention the fact that designating an area as providing a particular experience does not guarantee that all who enter will actually share those values, it may still be difficult to identify shared perceptions . . ." (Schreyer 1976). In light of this, it becomes necessary to delineate those users whose personal definitions of and objectives for wilderness are most closely aligned with those of the Wilderness Act. This is the rationale behind the wilderness purism scale. Stankey (1971) states:

"By selectively considering the attitudes and perceptions of a population which has the most highly developed appreciation of wilderness values, recreation use may be maintained at a level consistent with the preservation objectives of the Wilderness Act while also insuring the availability of a high quality wilderness experience."

Additionally, Hendee et al. (1968) point out that by differentiating users on the basis of wilderness-oriented values, "the possibility of . . . inferring tastes and preferences is greatly enhanced."

And by incorporating the views of these users into the decision-making process, managers will be more likely to select criteria and set standards for acceptability, or limits on acceptable change, that are understood by and acceptable to wilderness users.

Visitor Perceptions of Resource Impacts

Just as crowding is an evaluative term that describes a reaction to a particular set of circumstances in the social environment, so is resource damage a normative evaluation or judgement of some particular change that has occurred in the biophysical environment. Although the term 'impact' still carries a relatively negative connotation, it is somewhat less evaluative in nature than 'damage', and will therefore be used to describe changes in the biophysical environment that can be attributed to human use.

Research regarding visitor perceptions of resource impacts has been limited, and

studies that have explored this issue have generally done so peripherally (i.e. perception of impacts was not the main thrust of the research). One reason may be that although it is relatively easy to measure the amount of actual impact at a specific location, it is more difficult to accurately measure people's perceptions and evaluations of those impacts, and thus determine acceptabilty. And in addition to a lack of research regarding visitor perceptions of impacts, Graefe et al. (1984) point out that there has particularly been little research directed at the measurement of norms of particular user groups for specific impacts.

Much research has explored the issue of visitor perceptions of crowding, and some of these studies (Ditton et al., 1983; Vaske et al., 1982; Bultena et al., 1981; Womble et al., 1980; Zuckert, 1980) have found that perceptions of resource damage or environmental degradation are positively correlated with perceptions of crowding. This leads to the tentative conclusion that changes in the biophysical environment affect not only the area's ecological carrying capacity, but its social carrying capacity as well.

Vaske et al. (1980) explored perceptions of crowding and resource quality of visitors to an outdoor recreation area, and formulated parallel hypotheses regarding evaluation of the social setting and the biophysical setting. This author believes as well that much of the conceptual basis for research concerning encounters and perceptions of crowding can be useful in exploring visitor perceptions and evaluations of biophysical setting attributes. Several of the studies (Stankey, 1971; Lucas, 1980b, 1985; Lee, 1975) that have explored visitor perceptions of resource conditions have found that resource impacts can negatively affect visitor satisfaction with an experience.

Effect of Impacts on Visitors

Lucas (1980b) found that among experienced visitors to nine Wilderness and other roadless areas, about 30 percent perceived conditions in area quality as having worsened, with one of the two most common reasons being "more worn and littered areas". Visitor perceptions of environmental conditions ('wear and tear') were negatively correlated with satisfaction, and accounted for 18 to 49 percent of the variation in reported satisfaction. Lucas (1985), in a study of

visitors to the Bob Marshall Wilderness Complex, found that perceptions of impacted resource conditions were negatively correlated with overall trip satisfaction (gamma = −.35), more so than for any other measure, including number of parties met. This finding, together with the response of visitors that soil and vegetation impacts were worse in 1982 than in 1970, led Lucas to conclude that "there is clearly a growing problem of visitor impacts."

Stankey (1971) noted that at places where use is concentrated, such as at campsites, the opportunity for impact to both the environment and user satisfaction is increased. He hypothesized, based on his findings that campers perceived the campsite as "an extension of personal space, where primary interaction was between the individual and the environment", that impacted campsite conditions ('wear and tear') would negatively affect user satisfaction. His finding showed that 94 percent of visitors would be bothered by having to "camp at a place worn from overuse", with most being bothered "a lot". Stankey concludes:

"It appears clear then, that the undesirable effects associated with the overuse of camping locations are perceived largely in a very negative vein and differences in opinion about those effects are primarily matters of degree rather than direction. Much greater unanimity is present among users in regard to the perception of this element of carrying capacity."

Lee (1975) investigated Yosemite National Park backcountry users' perceptions of and satisfaction with backcountry campsite conditions, including both social and biophysical attributes. Generally he found that satisfaction was most influenced by social attributes, although "satisfaction was reduced by evidence of visitor use on the physical environment", including disturbance or lack of ground cover.

Zuckert (1980) asked backcountry campers in Kings Canyon National Park if the area where they were camped seemed overused. Fifty percent responded 'yes'; reasons included 'number or large size of fire rings' (26 percent), and 'impacted vegetation' (13 percent).

Womble et al. (1980) investigated backcountry users' perceptions of and responses to biophysical impacts in three Alaskan National Parks, and found that fire rings, 'campsites', and tree damage were among the five most-noticed impacts. Although they found that campers were generally not too bothered by seeing these impacts, resource impacts did influence feelings of crowdedness (more than did 'density' in two Parks).

Shelby and Harris (1982) conducted a study evaluating different methods of determining visitors' evaluative standards for bare ground and fire rings at campsites in the Mt. Jefferson Wilderness in Oregon. While they found that evaluations of specific impacts based on photographs agreed with on-site evaluations 90 percent of the time, a relatively wide range of standards was found for the different sites used in the study. This could be due to several reasons, including the effect of extraneous variables such as scenic, locational, or functional attributes of the campsites, and differing attitudes and beliefs of the participants in the study.

In summary, this literature suggests that campsite impacts are one of many influences on wilderness user satisfaction. However, research that controls for other variables is needed to more clearly understand how users perceive and evaluate campsite impacts.

Evaluative Standards and Saliency

When encountering a particular attribute in a certain setting, different recreationists will respond to, and evaluate, that attribute differently. The reasons for differing evaluations of the same attribute are complex, and involve many variables, but central to the issue are the concepts of evaluative standards and saliency.

An evaluative standard is an individual's personal, internalized norm, or personal definition of the acceptability of a particular attribute. Shelby and Heberlein (1984) state that "evaluative standards determine the level of an impact parameter [or attribute] that is tolerable (the maximum) or most desirable (optimum)", and go on to describe evaluative standards as "'yardsticks' for determining how much is too much."

Recreationists have different ideas about the appropriateness of different attributes, or of varying levels of the same attribute; these are expressed through their evaluative standards. Shelby and Heberlein (in press) outline a method for determining group evaluative standards or norms by measuring the preferences of individuals under specific conditions, then identifying a common point of agreement which serves as the standard.

These evaluative standards, or personal norms, may be based on such factors as motivations for recreating, past experience, experience expectations, preferences, and group or social norms. Shelby (1980) and Shelby et al. (1983) found that both expectations and preferences, but especially expectations, had a significant effect on perceived crowding; Schreyer and Nielson (1978) and Schreyer (1982) found that a person's level and type of experience and the type of group with which the person is recreating can also affect expectations.

As an attribute is perceived, it is 'filtered' through this evaluative standard, resulting in an evaluation of the attribute as adding to or detracting from the experience. If the evaluation is positive, it may then serve to increase satisfaction (or reduce dissatisfaction).

Understanding users' specific tolerances of varying levels of an attribute, as expressed through an internalized norm or evaluative standard, is important to managers trying to set appropriate standards, or limits of acceptable change, for chosen indicators (attributes).

Also important to the formation of personal norms and the evaluation of attributes is the concept of saliency. McCool (1984a) defines saliency as "the importance or relevancy of a particular setting attribute to a recreational engagement."

Saliency affects perceptions of attributes in two ways. First, it affects the formation of an internalized, evaluative standard for an attribute. If an attribute is not important to a person, then he or she will be less likely to be able to articulate a standard for that attribute, and consequently will not be able to make an

evaluation of that attribute. Martin (1985) in unpublished analyses of data collected the previous year, found that visitors for whom solitude was important (as measured by a 'privacy' outcome domain scale) were more likely to be able to articulate a standard for preferred encounters than visitors for whom solitude was less important. McCool (1984b) found that among respondents to whom encounters 'didn't matter', significantly more were in the lower quartile on the solitude outcome domain scale than in the upper quartile.

Second, saliency of an attribute affects the actual perception of that attribute. If an attribute is not salient, a person is likely to either not perceive it at all, or perceive it in a limited or perceptually-distorted manner. Shelby and Colvin (1982) found that river floaters on the Illinois and Rogue rivers in Oregon often under-reported the number of other groups they encountered, particularly at higher encounter levels. This would suggest that for those users who under-reported encounters, solitude was not a salient attribute; if it were, one would expect reported encounters to be more accurate.

It is known that user evaluations of encounters vary according to the type and level of encounters (Stankey, 1971). This would suggest that user evaluations of biophysical impacts may also vary according to the type and level of impact. Additionally, if the previous discussion concerning the varying importance of attributes to visitors is narrowed down to focus on specific biophysical impacts, it could be expected that the impacts under investigation would vary in their saliency, and thus in their acceptability, to visitors. These conclusions lead to the formulation of the following general hypotheses.

H1: Evaluations (as measured by acceptability) will differ among the three impacts under investigation.

H2: Acceptability of each impact will vary according to the level of impact.

Interior and Peripheral Campsites

Another objective of this study is to determine whether visitor evaluations of campsite impacts differ depending on where in the wilderness the impacts are encountered. In other words, are campsite conditions perceived differently if the campsite is in the wilderness interior as opposed to the periphery of the wilderness (e.g. trailhead zone)?

Several studies have found that visitor reactions to encounters are at least partially dependent on where the encounter takes place. Lucas (1964) found that visitors to the Boundary Waters Canoe Area made distinctions between the interior and peripheral zones of the area, generally perceiving the interior as 'wilderness', but not the periphery. The specific perceptual boundaries differed according to the type of user (e.g. paddling canoeist or motorboater), and also the type and number of other groups encountered.

Stankey (1971) hypothesized that visitors expect to encounter others more frequently in trailhead zones, 'de-sensitizing' them to the effect of the encounter. He then found that visitors were about eight times more likely to prefer to meet others in the periphery of the wilderness than in the interior. He concludes that "users [appear to] conceptually zone wilderness at a macro-scale, identifying at least one peripheral region and a core region. Within these zones, expectation of other encounters and the consequent behavior and attitudes toward such meetings appear to differ sharply".

Likewise, studies of river floaters (Shelby, 1981; Titre and Mills, 1982) have found that perceptions of crowding and visitors' encounter norms vary depending on whether the encounter is at the river access point (a functional equivalent of a trailhead), on the river, or at campsites along the riverbank.

Invoking again the parallel between social impacts such as encounters, and biophysical impacts such as campsite impacts, the following hypothesis is formulated.

H3: Visitors will evaluate campsite conditions differently depending on whether the campsite is in an interior or peripheral zone. Specifically, campsite impacts at interior sites will be judged less acceptable than equal impacts at peripheral campsites.

Evaluative Standards of Different User Groups

It is often desirable to compare and contrast certain characteristics of different types of users in order to better understand the differences that exist among them. Knowledge about the needs and preferences of different types of users can help managers in choosing management strategies and avoiding conflicts both among users and between users and managers.

Evaluative standards are of particular concern in this study. A general issue that this research addresses is: Do different user groups or typologies exhibit different evaluative standards for campsite impacts?

Wilderness Value Orientation, or Purism

At the beginning of this chapter, the rationale for using a wilderness purism scale was explained. Briefly, that rationale was that when managing an area as wilderness, managers should listen most closely to those users whose personal definition of and objectives for wilderness are most closely aligned with the Wilderness Act. Specifically, when using the Limits of Acceptable Change framework, McCool (1984a) states that "the choice of indicators and appropriate standards should be influenced by how important or salient outcomes and attributes are to individuals seeking experiences closely allied with the Wilderness Act."

Hendee et al. (1968) found that 'wildernists', or wilderness purists, differed from 'urbanists', or non-purists, with regard to socio-demographic characteristics, attitudes and beliefs toward wilderness, motivations for visiting wilderness, behavior on wilderness trips (or behavioral intent, at least), and attitudes toward management policies. Furthermore, it was found that the more purist users strongly rejected presence of human improvements, facilities, or 'artifacts'.

Regarding the 'anti-artifactualism' of the purists, Hendee et al state that "the implication is that wilderness use is strongly based on a rejection of man's permanent presence in the natural environment."

Perhaps even more important to the focus of this study was the high correlation that Hendee et al. found between wilderness purism and what they termed 'primevalism'. They interpret this as meaning that "strongly motivated wilderness users seem devoted to satisfactions obtained from perceiving the undisturbed natural environment."

Stankey (1971), using a different scale to evaluate users' purist or non-purist tendencies, also found differences between the two groups. Purists were much more likely to be bothered by meeting other parties, and "strong purists differentiate much more sharply than other groups about the types of use they meet, and their satisfaction declines more sharply and rapidly with increases in the level of use." Stankey also found that the more purist a visitor was, the more likely he or she was to react strongly to perceived crowding, even to the point of changing their route or cutting short their trip.

Regarding campsite impacts, Stankey (1971) noted that "beat up campsites are probably not considered desirable in any context, but their presence in an environment where evidence of man is to be minimal makes them particularly distressing to those persons seeking pristine and natural surroundings." He found that 98 percent of strong purists would be bothered by having to camp at an impacted campsite.

In light of the differences between purists and non-purists that Hendee et al found with regard to the presence of man's influence on the natural environment and satisfaction with perceiving an undisturbed natural environment, and Stankey's findings concerning the different perceptions of and reactions to crowding of purists and non-purists, the following hypotheses are formulated.

H4a: Those respondents classified as 'purists' will evaluate the campsite impacts as less acceptable than will 'non-purists'.

H4b: Purists will be more likely than non-purists to make a distinction in their evaluations of the 'interior' and 'peripheral' campsites, evaluating the 'interior' campsite conditions as less acceptable than the 'peripheral'.

Method of Travel

A number of studies have shown that users differentiated by method of travel often have different attitudes and perceptions concerning both social and biophysical setting attributes. Lucas (1964) explored perceptions of paddling canoeists, motorized canoeists, and motorboaters, and found that each group had a different perception of the area considered wilderness. Paddling canoeists had a 'stricter' perception of wilderness than the other groups -- the area they perceived as wilderness was smaller than that of motorized users.

Likewise, the groups differed in their perceptions of encounters and crowding. Paddling canoeists were more likely to mention overcrowding as a source of dissatisfaction than were motorized users. They were twice as likely to complain about crowded conditions, and reacted in a consistently negative manner to increasing use levels. Paddling canoeists were also more sensitive to the types of other groups encountered, distinguishing more sharply between the kinds of use in addition to the amount of use.

Stankey (1971) found similar responses in his study of BWCA visitors. Paddling canoeists differed from motorboaters in their attitudes toward encounters with others. Stankey noted that paddling canoeists were also "decidedly more purist" than other groups of BWCA users.

Kelly (1979) found differences between hikers and motorcyclists in motivations and definitions of appropriate or acceptable behavior in the Rattlesnake National Recreation Area and Wilderness. With regard to methods of travel, hikers were less accepting of horse and motorcycle travel than were motorcyclists. Out of eighteen potential recreation activities that users were asked to rate for acceptability, hikers differed from motorcyclists on twelve, holding narrower, or more restrictive, views on eleven of the twelve.

Lucas (1985) in his study of visitors to the Bob Marshall Wilderness Complex, found that impacted campsites were more objectionable to hikers than to horse-users. Thirty six (36) percent of hikers rated campsite conditions as fair to poor, compared to 21 percent of visitors travelling with stock.

The preceeding discussion and review of applicable literature has shown that method of travel can affect perceptions of and reactions to various setting attributes. In light of this, the following hypotheses are formulated.

H5a: Hikers will evaluate the campsite impacts as less acceptable than will horse-users.

H5b: Hikers will be more likely than will horse-users to make a distinction in their evaluations of the 'interior' and 'peripheral' campsites, evaluating the interior campsite conditions as less acceptable than the peripheral.

Level of Experience

In the previous two sections it was hypothesized that wilderness value orientation, or purism, and method of travel may affect visitors' perceptions of campsite impacts. In this final section, the possibility of experience influencing such perceptions will be explored.

Nielson et al. (1977), in a conceptual paper exploring user satisfaction and perceived crowding, hypothesize that "the relation between crowding and satisfaction will vary by time of exposure to an area . . . "

In a study of visitors to the Bridger Wilderness in Wyoming, Heberlein and Dunwiddie (1979) found that experience played a significant role in the selection of a campsite. Experienced campers tended to choose sites which were less littered and worn, generally more attractive, and which were farther from other occupied sites.

Vaske et al. (1980) conducted an empirical study paralleling Nielson et al.'s conceptual work. They hypothesized that more experienced users (i.e. users who

had visited the setting previously at lower use levels) would evaluate present social conditions as more crowded and the physical environment as more degraded. Their results supported both hypotheses.

In a study of Buffalo National River floaters, Ditton et al. (1982) found that crowded floaters were also the most experienced users on the river. Crowded users floated more times per year, had more years of floating experience, and had floated that particular river for more years than had floaters who perceived less crowding.

Schreyer et al. (1984) in a study of over 3100 river floaters from 13 rivers found that the more experienced floaters were more likely to perceive environmental damage to the river resource due to recreational use than were less experienced visitors.

Again, the preceeding discussion and review of literature has shown that experience may affect perceptions of both social and biophysical setting attributes. The following relationships are therefore hypothesized.

H6a: Visitors with more wilderness experience will evaluate campsite impacts as less acceptable than will less experienced visitors.

H6b: Experienced visitors will be more likely to make a distinction in their evaluations of the 'interior' and 'peripheral' campsites, evaluating the interior campsite conditions as less acceptable than the peripheral. difference that is significant at the $p < .01$ level.

METHODS

The methodology of this study was created around a series of experiments. Each experiment was designed to investigate one different aspect of visitor perceptions of campsite impacts. The treatment in each experiment was the same -- a series of indirect, artistic representations of impacted campsites.

A set of slides, produced from color illustrations, was used to portray the impacted campsites. The color illustrations were depictions of campsites in undeveloped areas. By using a series of overlays, varying levels of bare ground and fire ring impact were introduced into the campsite scene. Tree damage was altered directly on the illustration by the artist.

These particular impacts were chosen because they are among the most prevalent impacts occuring at wilderness campsites, and contribute to both the visual impact and ecological integrity of the area. Bare ground and tree damage are representative of the soil and vegetation impacts that Cole and Fichtler (1983) and Cole (1982; 1983; 1985b) have found so prevalent and important at campsites in Montana and Oregon, that Washburne and Cole (1982) found were common problems of managers, and that Lucas (1985) found were disturbing to visitors. Fire rings were chosen to represent a human development type of impact that is also both visual and has associated ecological impacts (e.g. firewood gathering resulting in trampled vegetation and increased tree damage).

This research design is a modification of a design used by Shelby and Harris (1982), in which both on-site inspection and photographs of actual campsites were used. Shelby and Harris found a 90% agreement rate between photographs and on-site inspection in terms of the acceptability and desirability of the campsites. The decision to use illustrations for this study was based on a desire to control extraneous factors such as scenic, functional, or locational attributes of the campsites, and the context in which the impacts are encountered. These factors may affect how a person perceives the impacts at a particular campsite.

Indirect representation by means of photographs, slides, or sketches are

frequently used to represent an environment, or particular component of an environment, to a set of observers or respondents. By using such indirect extraneous factors such as those mentioned above may be controlled. The disadvantage, however, is the possibility of misrepresenting other components of the environment, resulting in inaccurate responses. For this reason the high agreement rate found by Shelby and Harris (1982) between direct and indirect representation of campsites is encouraging. This does not guarantee, however, that the representations used in this study are equally accurate.

The primary differences, then, between this study and that of Shelby and Harris are the type of indirect representation (photographs vs illustrations), the control of extraneous attributes of the campsites, and control over the types and levels of impacts represented and being responded to. Additionally, the wilderness purism scale asked of respondents in this study allows their ratings of the impacts to be tabulated and interpreted while controlling for purist or non-purist attitudes toward wilderness; wilderness experience and method of travel can also be controlled for.

A questionnaire was used to collect data (see Appendix B.) The questionnaire provided explanatory information concerning the slides that respondents would view; information about the situational context in which they would be viewed; and provided for the responses to each slide. Questions related to the respondent's amount of experience and method of travel on wilderness trips, their membership in conservation or environmental organizations, and if they hunted in wilderness were included. A ten-item modified version of the wilderness purism scale used by Stankey (1971) was also included.

Dependent variables were measured through responses to each campsite slide or pair of slides; the answers to the questions described above were the independent variables.

The sample population consisted of persons attending meetings (not necessarily members) of local conservation-oriented groups such as the Sierra Club and the Backcountry Horsemen's Association, and also students enrolled in Forestry and Recreation Management classes at the University of Montana. These groups were

used because they were readily available, and it was felt that such a population would contain a high percentage of wilderness users or potential users. This was the case, as 89% of the respondents had taken at least one wilderness trip in the two years previous to the study.

The first experiment was designed to measure visitors' acceptability standards for each of the three impacts. These standards were measured by having respondents view slides in which only one impact was present at the campsite. Four levels (minimum, moderate, heavy, and severe) of each of the three impacts (bare ground, tree damage, and fire rings) resulted in twelve slides.

Since artistic representations were used, actual measurements of the amount of impact (e.g. square feet of bare ground, or diameter of fire rings) were not possible. The campsite representations were, however, modelled after photos of actual campsites; the amount of impact was judged, and the above labels applied, by means of expert judgement.

A slide of the campsite in its pristine condition was included, as was a slide of the campsite with 'multiple' (2) fire rings, resulting in a total of fourteen slides. These fourteen slides were of the same campsite, in the same setting, with the same background; the only variable was the type or level of impact. (See photos 1 through 14 in Appendix A.)

The fourteen slides were randomly ordered, and the respondents were instructed to rate each campsite in terms of its conditions, not in terms of the desirability of the setting. The word "conditions" was purposely chosen instead of "impacts" because it seemed more neutral, and avoided the negative connotation of the word "impact". The respondents were then given a brief 'preview' of the slides to familiarize them with the range of impact they would see. This was deemed necessary following a pre-testing period in which respondents commented that they lacked a set of endpoints within which to place the impacts. In other words, respondents were "saving" the 'unacceptable' response for later slides that they thought would be worse. Respondents viewed each slide for about ten seconds. Responses to the slides were measured at the ordinal level using a Likert-type

scale. Response choices were: 'desirable', 'acceptable but not desirable', and 'unacceptable'.

The second experiment was designed to measure the relative importance of the three impacts under investigation. This was measured through a paired comparison approach. Three pairs (fire ring/tree damage, fire ring/bare ground, tree damage/bare ground) for each of three impact levels (moderate, heavy, and severe) resulted in nine (9) pairs. (See photos 15 through 23 in Appendix A.) These slide pairs were shown to respondents, who simply indicated the campsite at which they would prefer to camp. Nine additional pairs utilizing a second campsite background or setting were also shown. A preliminary analysis was performed to check for significant differences in responses due to background; when none was found, the second set of nine slides was deleted.

The third experiment was designed to determine if visitor acceptability of impacts is at least partially dependent on where in the wilderness the impacts are encountered. slides of campsites were shown to respondents with instructions specifying the context in which the campsites were to be viewed. Nine slides were shown, depicting campsites that exhibited varying degrees of all three impacts together. Respondents were instructed to rate each campsite (again using the three-point scale described above) in the context of having encountered it in the wilderness 'interior' -- several days hike or ride from the trailhead.

Next, the same nine slides were shown again, and respondents instructed to rate each campsite in the context of having encountered it on the first day's hike or ride from the trailhead (the wilderness periphery). Comparisons of the two ratings for each slide made it possible to determine if respondents react differently to the same level of impact depending on the 'opportunity zone' in which they encounter it. Preliminary analysis showed significant differences occurring for four of the nine slide comparisons, therefore the other five slides were dropped. (See photos 24 through 27 in Appendix A.)

A fourth experiment was designed to determine the extent to which the perceived amount of impact at a campsite correlated with the acceptability rating

for that campsite. The same fourteen slides shown to respondents in the first experiment were shown again. This time, respondents were asked to indicate the amount of impact they felt was present at the campsite. Response choices were 'None', 'Minimal', 'Moderate', 'Heavy', and 'Severe'. Spearman's rho correlation coefficients were computed using the 'acceptability' and 'amount' responses to each slide. The experiment was discontinued after the sample size reached 73. The coefficients showed a highly significant correlation between perceived amount of impact and the acceptability of the campsite conditions, and it was felt that further testing was not necessary. It was also felt that the number of slides respondents were viewing needed to be reduced.

The final experiment, which was added in the latter half of the testing period, was designed to determine whether visitors might be willing to "trade" scenery for a less impacted campsite. Four slide pairs were created, using slides already available from other portions of the study. Each slide pair consisted of one campsite that was subjectively determined by the investigators to be less scenic, and one campsite likewise determined to be more scenic. The less scenic campsite exhibited either minimal bare ground impact or moderate tree damage. The more scenic campsite exhibited heavy and severe levels of these two impacts. (See photos 4, 5, 8, 9, 18, and 28 in Appendix A.) Respondents were asked to indicate the campsite at which they would prefer to camp on a wilderness trip.

In addition to the responses to slides of impacted campsites, respondents were asked a number of questions. The amount of time spent in wilderness was approached by asking how many trips they had taken into a wilderness area in the past two years, and how many days they had spent in the wilderness on those trips. Primary method of travel in wilderness (hike, horseback, etc.) was asked, as well as whether or not they belonged to any environmental or conservation-oriented groups, and whether or not they hunted in wilderness areas.

For each experiment the sample population could be stratified on the basis of these independent variables. Additional experiments were then performed to test the effect of these independent variables on responses to the impacted campsites.

A ten-item 'wilderness purism' scale was administered to each respondent following ratings of the slides. This scale was a modification of Stankey's purism test (1971). The test was meant to measure the degree to which the respondent's objectives concerning wilderness relate to the objectives set forth in the Wilderness Act. Respondents were given a 'purism score' based on their responses to the items in the purism scale. The strength of the association between respondents' purism scores and their responses to the campsite impact slides was used to determine if there are differences in evaluations and acceptability standards depending on the wilderness value orientation of the visitor.

VISITOR RESULTS and DISCUSSION

The results presented in this chapter pertain only to the user groups tested; results from the group of BLM wilderness managers will be presented in the following chapter.

While some socio-demographic characteristics normally asked of respondents (such as age, income, education) were not asked in this study, a profile of a typical respondent can be constructed as follows. A majority of the 186 respondents went on between one and seven wilderness trips in the two years previous to the study. About 64% of the respondents were hikers, while one-third travelled with stock; nearly half were hunters, and just over 40% were members of conservation or environmental groups. Generally the respondents were not as strongly purist as those sampled by Stankey (1971). Possible scores on the purism scale ranged from 10 to 50; the range in this study was from 20 to 50, with the median falling between 34 and 35. Table 1 shows each of the groups that were tested along with the date of testing and sample size.

A non-parametric correlation matrix was constructed including three variables: purism score, level of wilderness experience, and A.S.I. The A.S.I. was simply the sum of each respondent's ratings of the fourteen (14) slides of campsite impacts. Spearman's rho correlation coefficients were computed in order to gauge the strength of association between respondents' standards and 1) their wilderness value orientation (or purism), and 2) their level or amount of wilderness experience (see Table 2).

Responses were coded as follows: 1) higher purism scores denote more 'purist' attitudes; 2) higher responses for 'Experience' indicates a higher experience level; 3) higher A.S.I. scores denote higher or stricter standards for campsite impacts.

The relationships most meaningful or central to this study are those among the variables Purism, Experience, and A.S.I. A significant positive correlation between Purism and A.S.I. suggests that respondents with more 'purist' attitudes were more likely to have stricter standards for campsite impacts than 'non-purists'.

	Group	Sample Size (n)	Date
1.	Missoula Sierra Club	10	4/86
2.	U of M Forestry Graduate Seminar	15	4/86
3.	U of M Intro. Rec. Mgmt. class	40	4/86
4.	Missoula Backcountry Horsemen's Assoc.	11	5/86
5.	Bitterroot Backcountry Horsemen's Assoc.	18	10/86
6.	U of M Wilderness and Civilization class	19	10/86
7.	U of M Intro. Rec. Mgmt. class	41	10/86
8.	BLM Wilderness Managers	44	11/86
9.	Flathead Backcountry Horsemen's Assoc.	32	1/87

Table 1. Groups tested

Purism	.1031*		
Experience	.0201	.0540	
	A.S.I.	Purism	

* denotes significance at p < .10

Table 2. Spearman's rho correlation coefficients

The positive correlation between Experience and Purism suggests that the more experienced users hold more purist attitudes, (or, that purists tend to be more experienced), but this relationship was not statistically significant. Likewise, the correlation between Experience and A.S.I., while positive, was not significant. This would suggest that purism might affect a user's internalized standards of acceptability for impacts more than does their level of experience. One explanation for this might be that the more experienced users have come to expect a certain amount of impact at campsites and have realistically adjusted their personal standards accordingly, while purists (not all of whom are experienced users) are sticking to their more idealistic standards.

Wilderness Purism Scale

The wilderness purism scale, modified from Stankey's (1971) original scale, was comprised of ten items which respondents could agree or disagree with. Scoring was arranged so that 'purists' would score higher. As mentioned earlier, purism scores ranged from 20 to 50; the possible range was from 10 to 50. A factor analysis was performed on the responses to the ten scale items, and the Varimax rotated factor matrix extracted three factors as follows.

Factor 1:	Game	Factor2:	Shelter	Factor 3:	Solitude
	Fish		Roads		Evidence
	Dams		Camp		Man
			Motor		

See Appendix C for individual factor loadings.

This would seem to support the notion that the scale is multi-dimensional, as Stankey (1973) suggested. The three factors extracted by the analysis might equate with certain dimensions of a wilderness experience. For instance, the items in Factor 1 would seem to fit most closely into what Hendee et al. (1968) termed the Primevalism factor; Factor 2 seems to correlate with the Anti-Artifactualism factor; and Factor 3 with Hendee's Escapism factor.

It should be noted that a reliability analysis performed on the wilderness purism items produced an alpha of 0.65. This suggests some inconsistency in the

responses to the scale items, but this is not altogether surprising for a scale that may tap several different dimensions of an experience (some of which may be more or less important to an individual than others).

Hypothesis 1

It was hypothesized that respondents would react to and evaluate each of the three impacts differently, as measured by acceptability ratings. In other words, the three impacts would vary in their saliency to visitors, with certain impacts being more important or more objectionable; thus respondents would distinguish between the impacts by rating them differently in terms of acceptability. This hypothesis was generally upheld, as shown by the impact desirability and acceptability curves in Figures 1 and 2 .

Bare ground was consistently rated acceptable by fewer respondents (n = 186) than either fire rings or ~~bare ground~~ tree damage, regardless of the level of impact. Fire rings and tree damage were rated acceptable by nearly identical proportions of respondents at the minimal and moderate levels; tree damage became slightly less acceptable than a fire ring at the heavy level of impact; at the severe level the three impacts differ distinctly in their acceptability.

What may be even more enlightening are the differences in proportions of respondents rating the impacts desirable and acceptable. For instance, of the 80 percent of all respondents who reacted favorably to the campsite with minimal bare ground (i.e. did not rate it as unacceptable), the large majority (61%) found it merely acceptable; only 19 percent actually thought it desirable.

Similar differences occur at other levels and for other impacts. For example, 80 percent of the respondents reacted favorably to the campsite with heavy tree damage, yet only 29 percent found it desirable; 51 percent said it was only acceptable. Likewise, 90 percent reacted favorably to the campsite with a large fire ring (heavy impact level), but only 35 percent found the campsite desirable.

This brings up the question of the kind of conditions for which to manage, or the kind of standards to set. Should managers set standards based on what is

Figure 1. Desirability Curves

for three campsite impacts

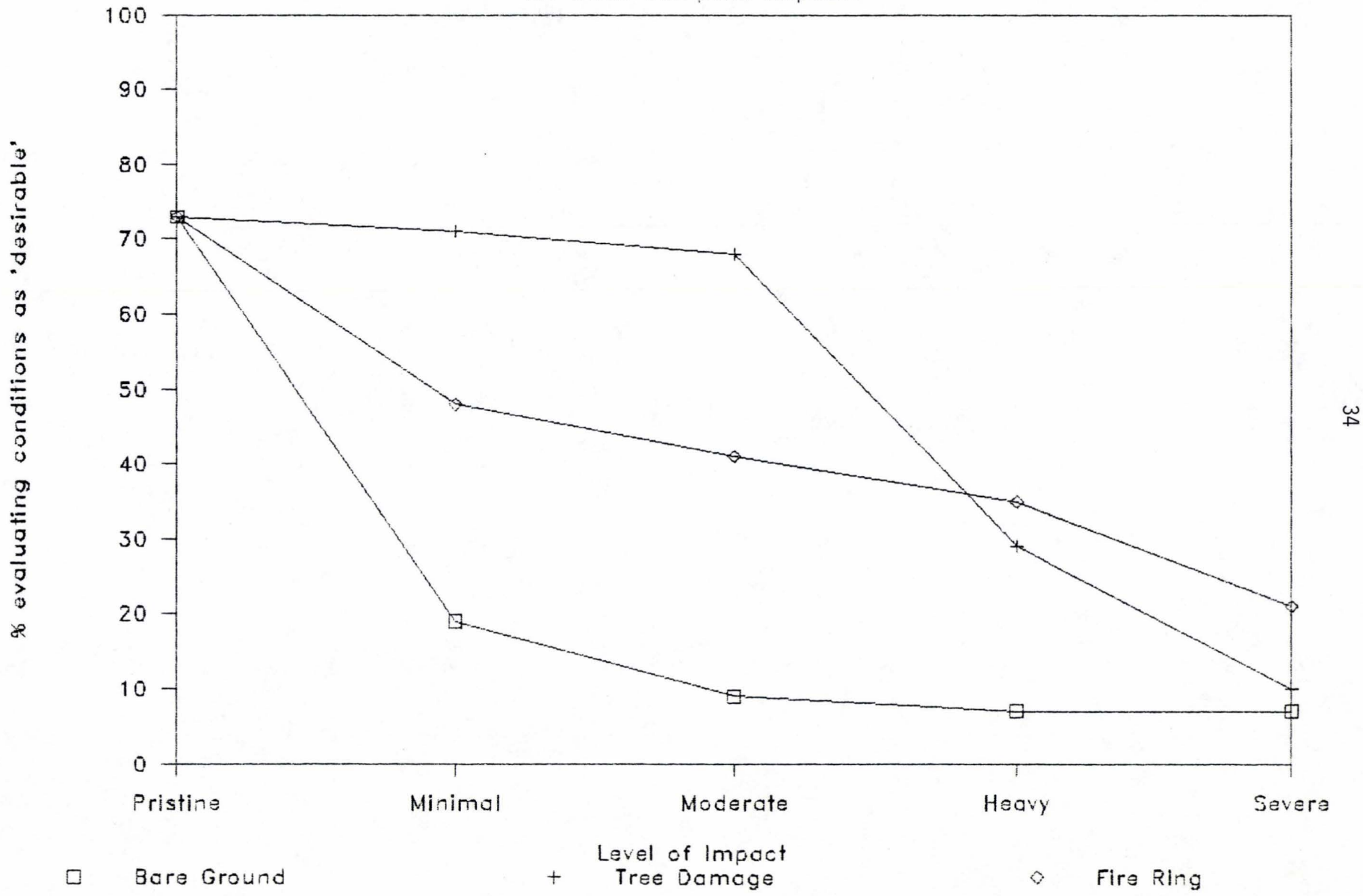
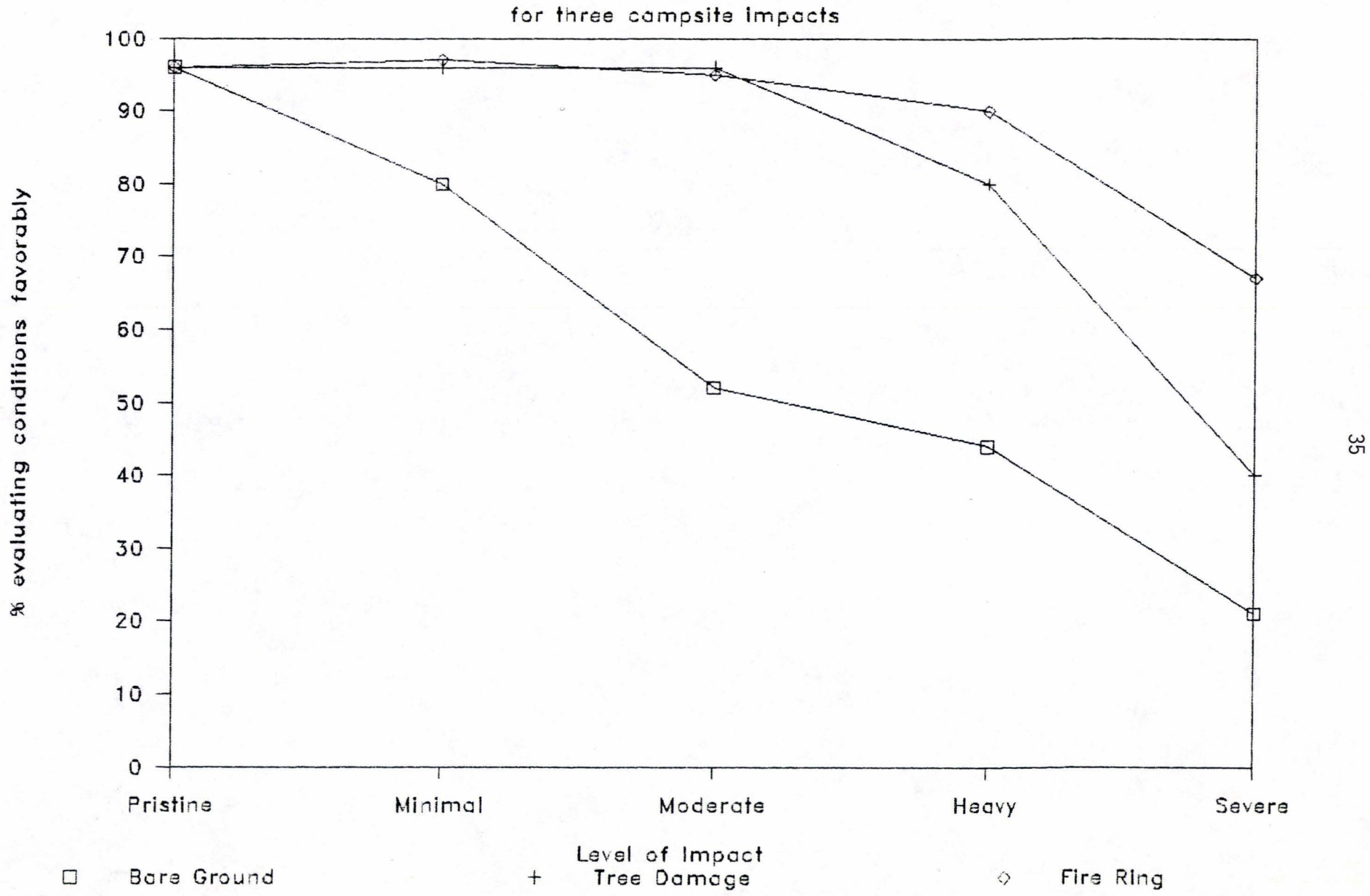


Figure 2. Overall Acceptability Curves



acceptable, or what is desirable? Should an area be managed to maintain minimally acceptable conditions, or desirable conditions - exceeding minimum standards? It is clear that there can be a significant difference between what is acceptable and what is desirable. Most respondents were willing to rate heavily impacted campsites as acceptable, but two of the three minimally impacted sites were undesirable to a majority of respondents.

Figure 3 displays results of the paired comparisons. It is apparent from these results as well that the three impacts differ in their saliency to the respondents in this study. At the moderate level tree damage was the 'least objectionable' impact, having been chosen by over 50% of the respondents, while only 7% chose bare ground.

As the impact severity increased to 'heavy' the number of respondents choosing the campsite with tree damage decreased substantially, from 55% to 36%. The campsite with a fire ring was chosen by more respondents, from 38% up to 51%; the site with heavy bare ground impact was chosen by the remaining 13% (up from 7%). Proportions of respondents choosing each of the three impacts changed little as the degree of impact was increased from heavy to severe.

Overall, respondents did evaluate each of the three impacts differently, as evidenced by the results presented in Figures 1, 2 and 3. Bare ground was consistently the least acceptable impact regardless of the degree of severity. At the lower levels of impact (minimum and moderate) there does not seem to be a clear or distinct difference in acceptability of fire rings and tree damage; at the heavy and severe levels, however, tree damage is consistently less acceptable than are fire rings.

Hypothesis 2

It was conjectured that overall acceptability (including desirability) of an impact would vary according to the level, or degree of severity, of the impact. Figures 4 , 5 , and 6 show that this is generally the case, although not without exception. The overall acceptability of bare ground did differ distinctly from one impact level to

Figure 3. Paired Comparisons

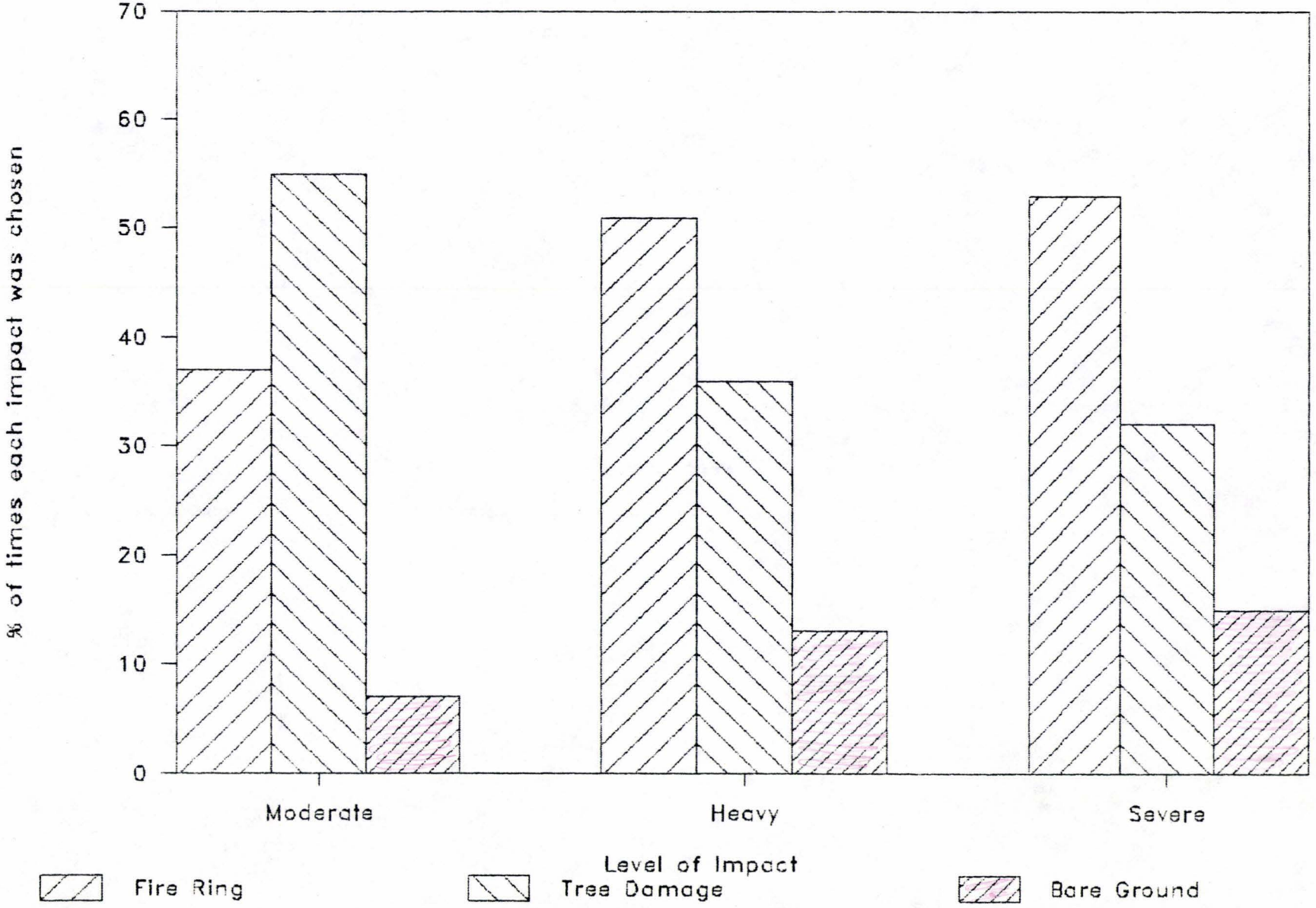


Figure 4. Desirability/Acceptability

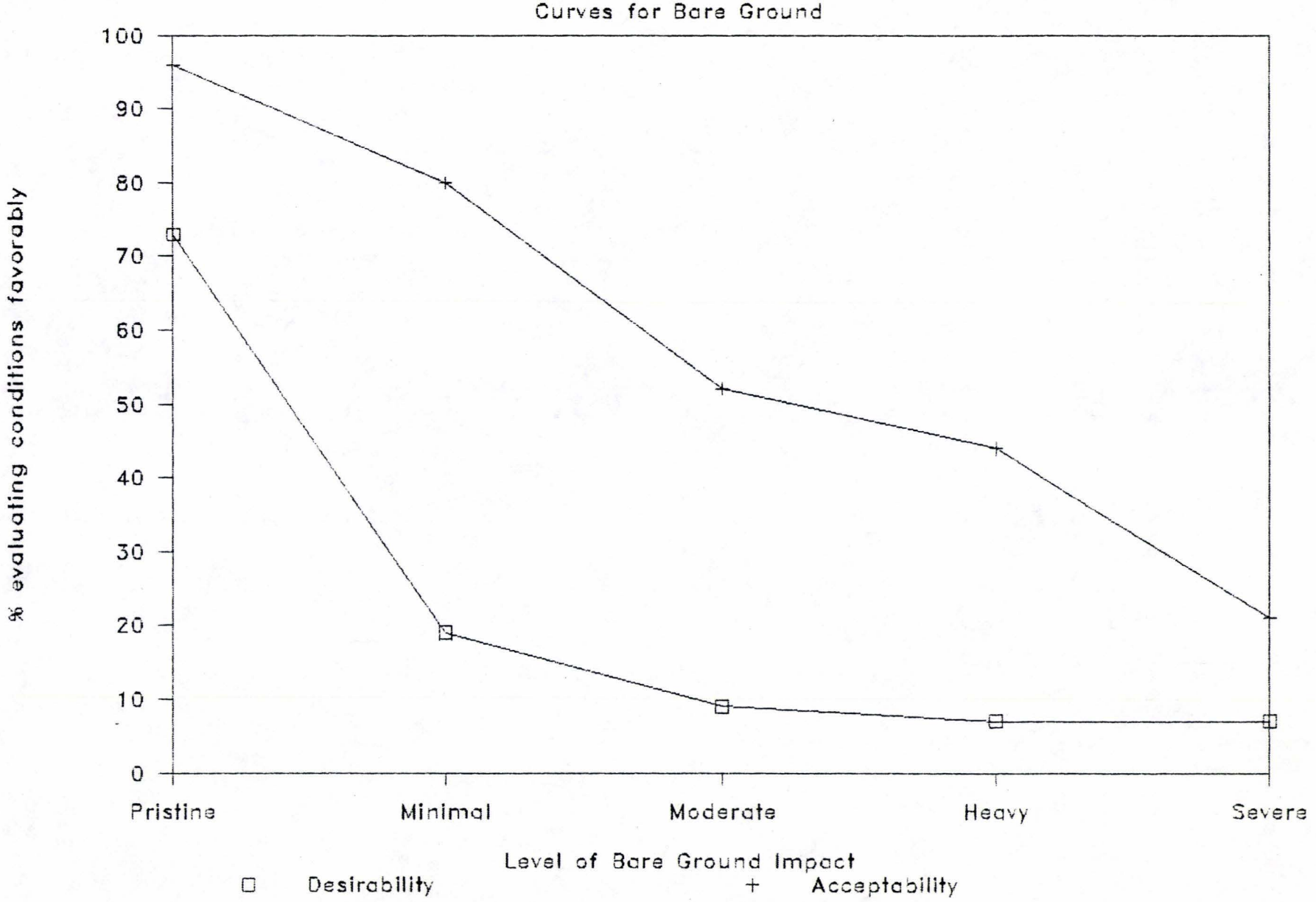


Figure 5. Desirability/Acceptability

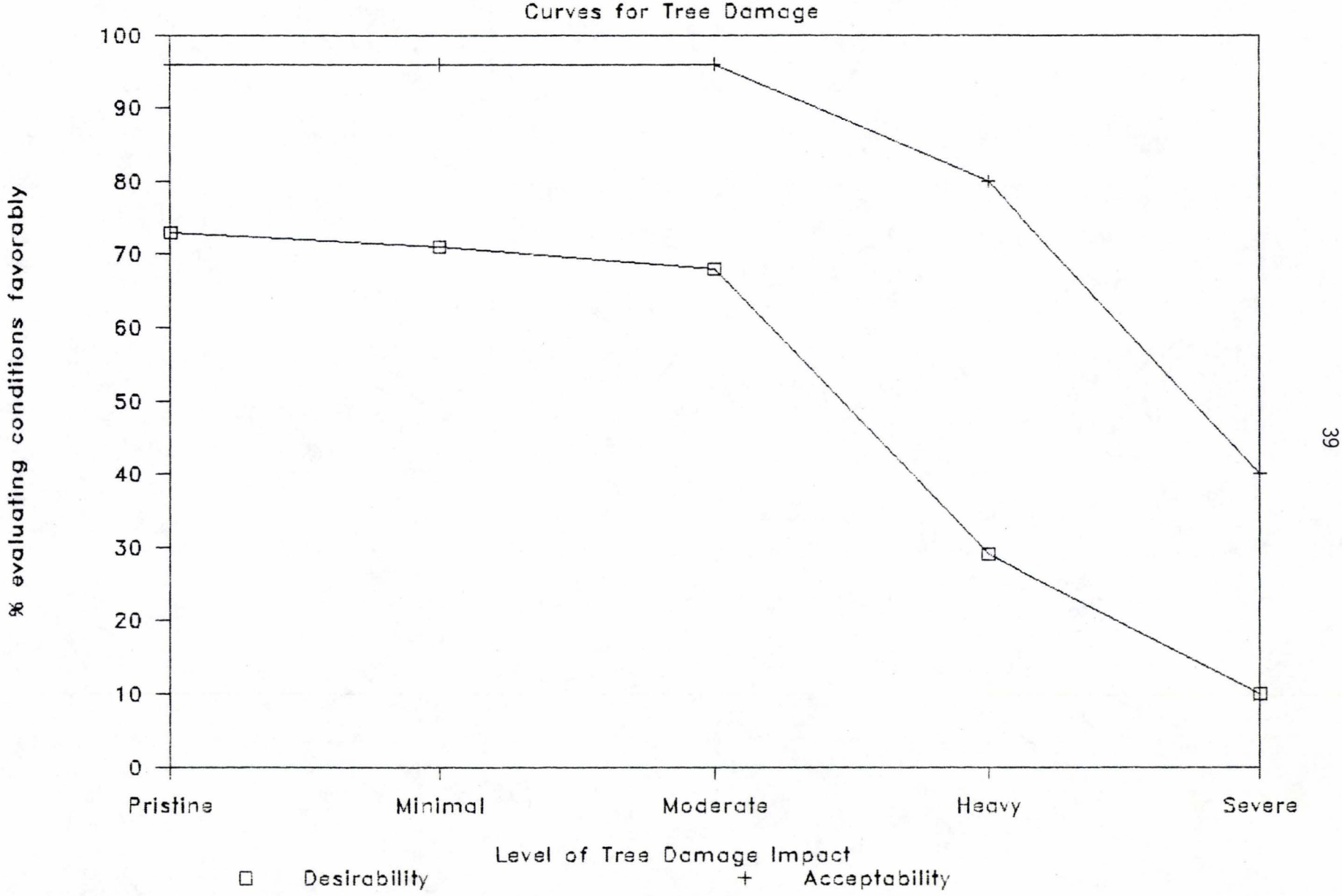
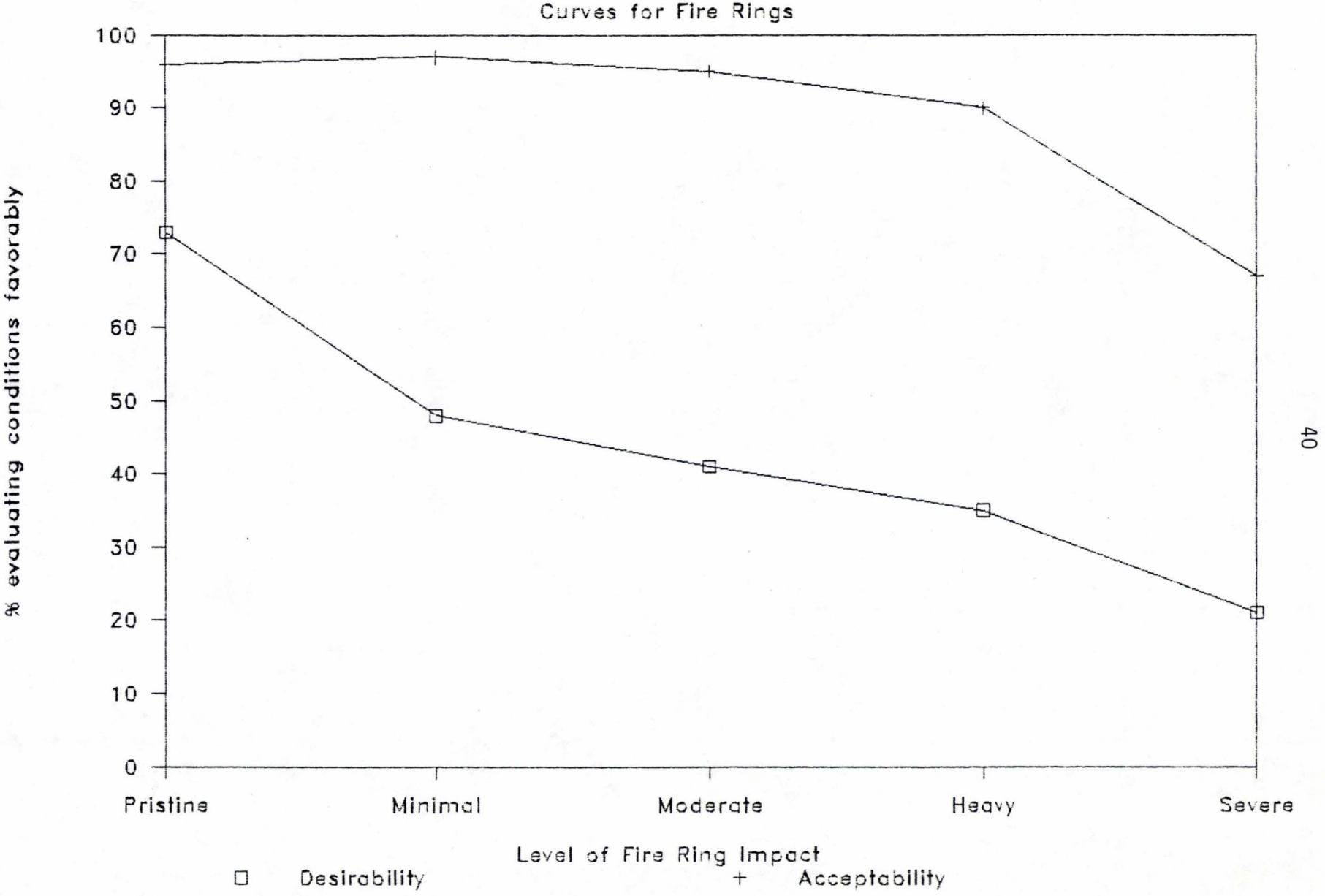


Figure 6. Desirability/Acceptability



the next, from 80% acceptability at the minimum level; to 52% for moderate bare ground; to 44% acceptability of heavy bare ground; and 21% for severe bare ground.

Differences in acceptability of fire rings or tree damage did not differ as distinctly from one impact level to the next, however. Acceptability of both these impacts was virtually unchanged from minimal to moderate levels. Overall acceptability of heavy tree damage did drop from 96% to 80%, although overall acceptability of heavy fire ring impact changed little (from 95% to 90%). Finally, as the impacts reached the severe level distinct differences in acceptability ratings occured. Overall acceptability of severe fire ring impact dropped to 67% (from 90%), while severe tree damage acceptability fell from 80% to 40%.

From the results displayed in Figures 4 through 6 it is possible to determine the point at which each impact becomes unacceptable to a majority of respondents. Overall acceptability of bare ground falls below the 50 percent level at a point between the moderate and heavy levels of impact. In other words, a moderate amount of bare ground is deemed acceptable by most respondents, while the campsite displaying a heavy amount of bare ground impact was rejected by a majority of respondents.

Similarly, tree damage becomes unacceptable to a majority of respondents at a point between the heavy and severe levels of impact. Fire rings were found to be acceptable even at a severe level of impact.

In order to determine the extent to which acceptability ratings of these campsite conditions correlated with the perceived amount of impact at the campsite, Spearman's rho correlation coefficients were computed. The sample size for this experiment was 73 respondents. Of the fourteen slides, correlation coefficients were significant at $p < .05$ for thirteen (13) of the slides; ten of those thirteen were significant at $p < .006$ or less. This supports the intuitive belief that acceptability of campsite conditions is indeed strongly related to the perceived amount of impact.

It is interesting to note that when a factor analysis was performed on the acceptability ratings for each of the fourteen slides, the slides factored out not by level of impact, but rather by type of impact (n = 186; see Appendix D for factors and factor loadings). Minimal through severe fire rings, plus the multiple fire rings slide, grouped together; the minimal through severe bare ground slides grouped together; the minimal and moderate tree damage slides fell out with the pristine campsite, while the heavy and severe tree damage slides grouped together. This suggests that visitors evaluate campsite impacts based primarily on the type of impact present, and then, secondarily, on the level of impact.

Interior and Peripheral Campsites

Hypothesis 3 stated that respondents would evaluate campsite impacts at an interior campsite differently than the same impacts at a peripheral site. Table 3 displays the results of one such comparison. Ratings of a campsite in the wilderness interior, and the same campsite in the wilderness periphery are cross-tabulated. Note that 'desirable' and 'acceptable' responses are lumped together, as they are both favorable responses.

For each pair of campsite evaluations, four pairs of responses were possible: respondents could find both campsites acceptable, both campsites unacceptable, the peripheral campsite acceptable but the interior site unacceptable, or vice versa. Logically, no one should have found the impacted campsite acceptable in the interior but unacceptable in the periphery; however, approximately ten percent of the sample did respond in this way.

The responses of interest are those in the lower-left cell. These are the respondents who found the campsite conditions acceptable or desirable in the periphery (defined as one day's hike or ride from the trailhead), but unacceptable in the interior zone. These respondents could be analyzed as a proportion of the total (184) respondents; however, their effect would be "diluted" by the responses of those who found conditions unacceptable even in the peripheral zone. For this reason, only those respondents in the left column will be considered in the analysis.

		Peripheral		
	Count Col. Pct. Total Pct.	Desirable/ Acceptable	Unacceptable	Row Totals
Interior	Desirable/ Acceptable	81 66.9 44.0	18 28.6 9.7	99
	Unacceptable	40 33.1 21.7	45 71.4 24.5	95
	Column Totals	121	63	184

Table 3. Crosstabulation of acceptability ratings for one pair of Interior/Peripheral campsites

Of the 121 respondents who found the campsite conditions acceptable in the peripheral zone, 40 (33.1%) found the site unacceptable in the interior. Table 4 displays equivalent proportions for all four of the Interior/Peripheral comparisons. Overall, just over one-third of the selected sub-population made a distinction, in the correct 'direction', between the acceptability of the campsite conditions in the two zones.

Whether or not this proportion is large enough to warrant different management objectives, actions, or standards for different zones in a wilderness remains up to the judgement of the manager. Statistically, the distinctions made between the two zones are significant. Non-parametric tests (Wilcoxon's signed-ranks and Kendall's W) show statistically significant differences in the acceptability ratings of the two campsites for three of the four pairs if the entire sample population is used, and for all four of the pairs if only the sub-population discussed above is used.

Apparently, the findings of Lucas (1964) and Stankey (1971) discussed in the previous chapter are upheld with regards to biophysical impacts as well, for some visitors at least, but it remains a judgemental decision as to whether this proportion of visitors who conceptually zone the wilderness are important in light of the management objectives and strategies for the area, and the types of opportunities it is being managed to provide.

Purism

It was hypothesized that purists and non-purists would evaluate the campsite impacts differently, with purists displaying stricter standards of acceptability. Purists and non-purists were arbitrarily defined in the following manner. On the basis of purism scores, the entire sample was divided roughly into thirds. The upper third (34.9%) were labeled 'purists'; the lower "third" (actually 38.4%) were the 'non-purists'. This resulted in 71 non-purists and 73 purists. The 41 respondents (26.7% of the sample) with moderate purism scores were disregarded in the analyses of purists and non-purists. As Figures 7 , 8 and 9 show, the hypothesis was generally upheld, although differences are not statistically significant in every case.

Slide Pair #	Entire Sample
1	33.1
2	35.8
3	40.2
4	27.8

Table 4. Percentage of respondents finding campsite conditions unacceptable in the Interior (of those finding conditions acceptable in the Periphery)

Figure 7. Purist and Non-Purist Curves

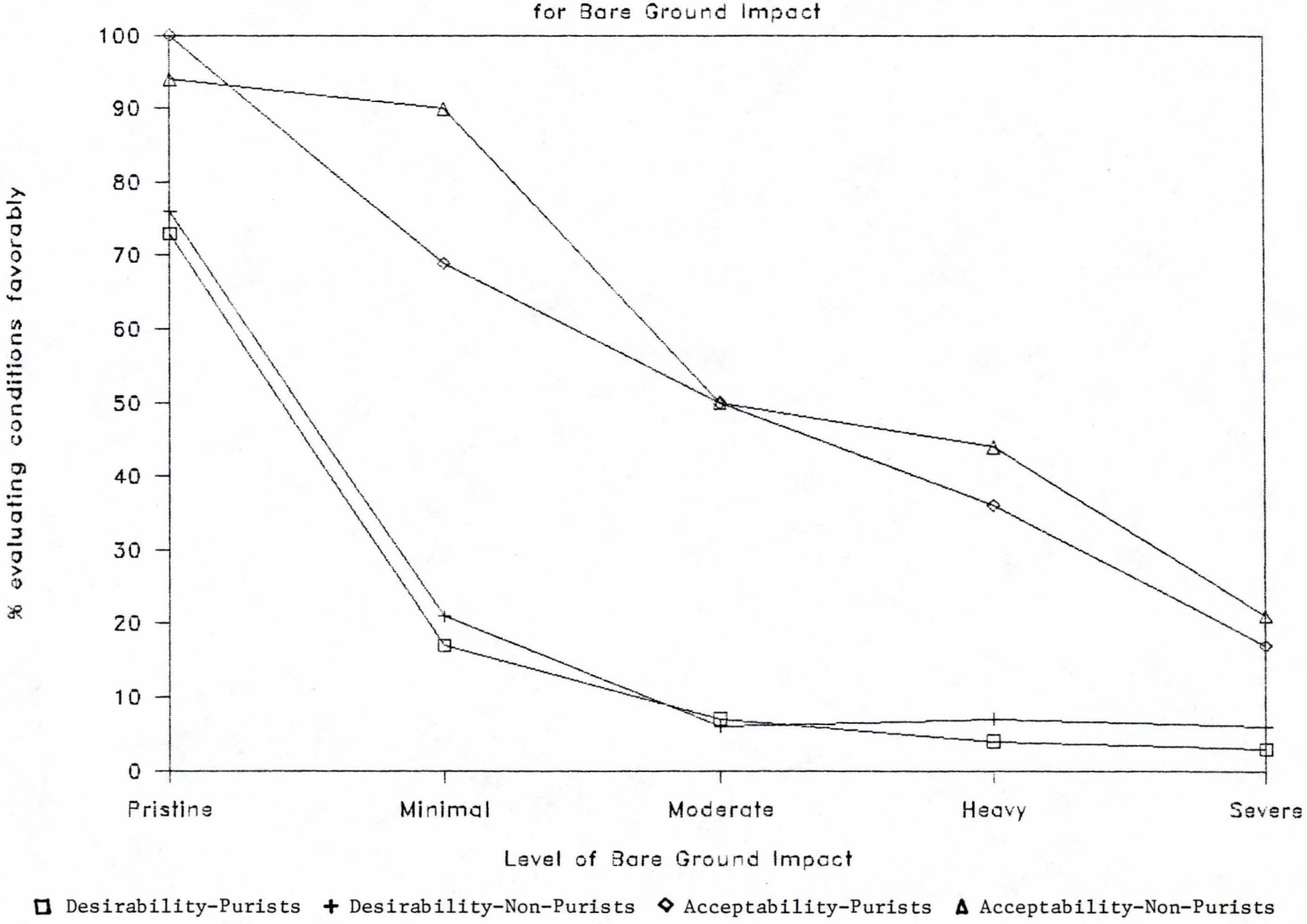


Figure 8. Purist and Non-Purist Curves

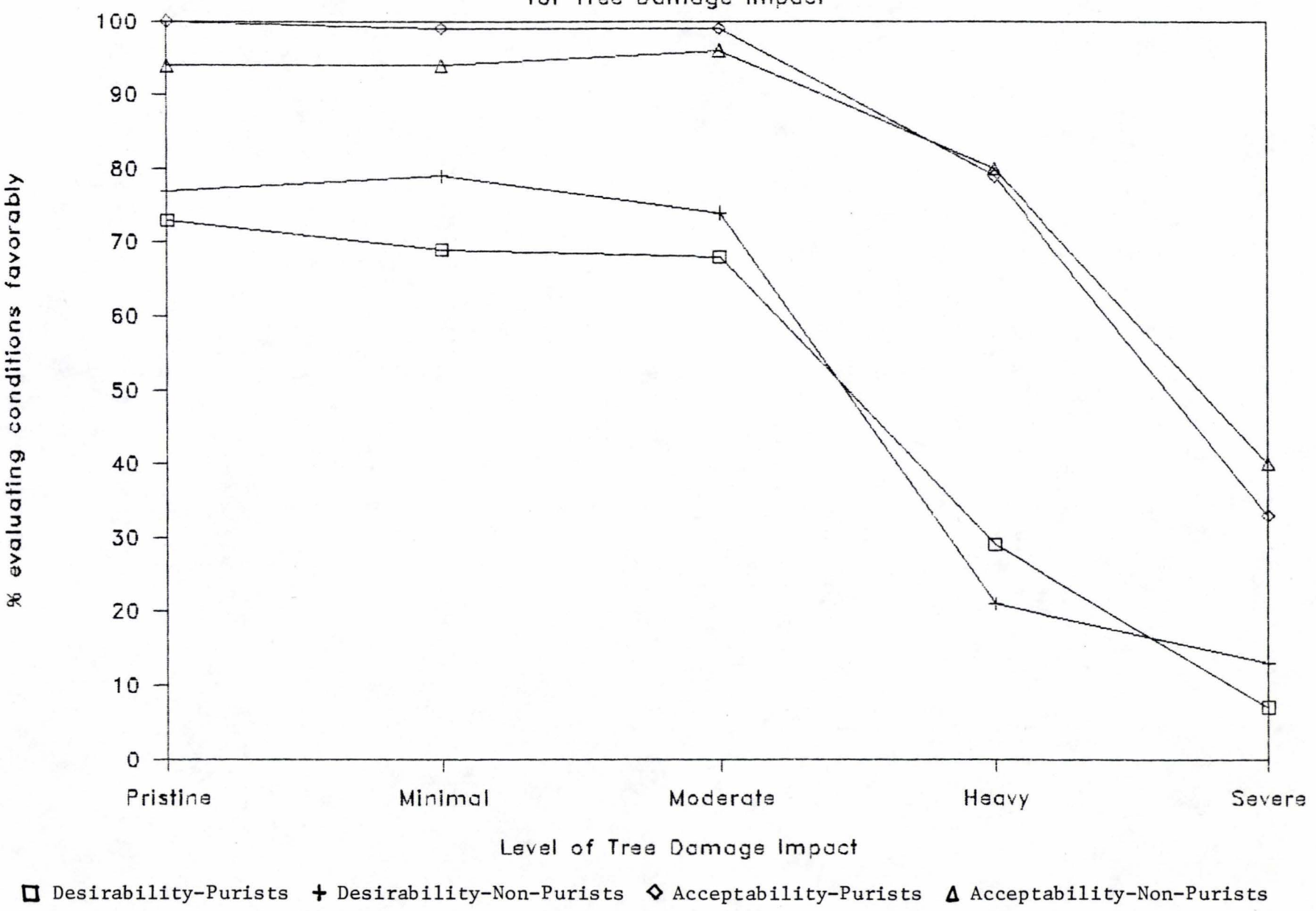
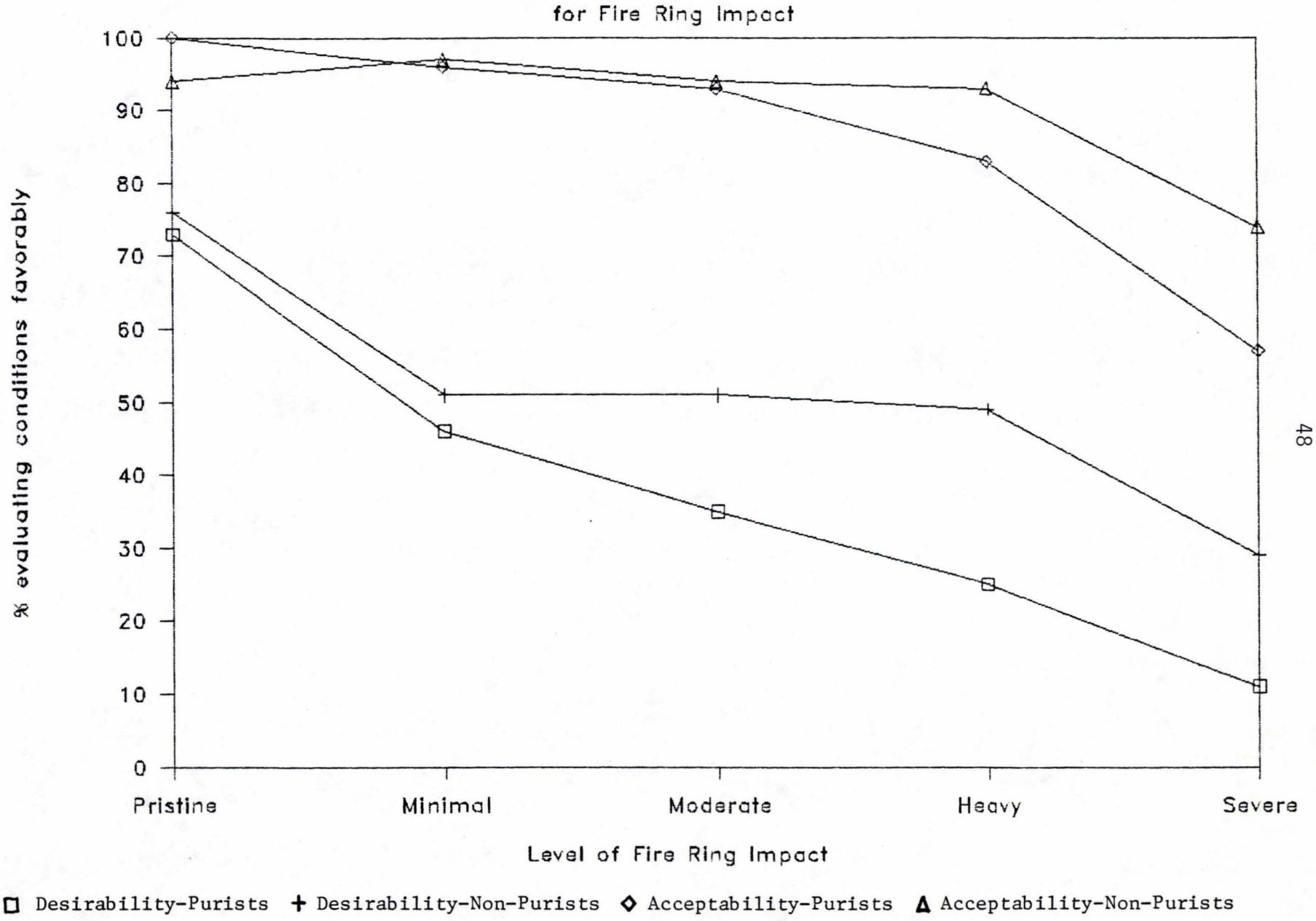


Figure 9. Purist and Non-Purist Curves



Purists and non-purists responded similarly to most levels of bare ground impact (see Figure 7). The most substantial difference was at the minimal level - this site was acceptable or desirable to 90 percent of non-purists, but only 69 percent of purists. This difference was significant at the $p < .05$ level. At the moderate, heavy, and severe levels of bare ground impact, differences between purists and non-purists are not significant.

Similarly, ratings of tree damage at campsites differed only slightly between purists and non-purists (see Figure 8). Again, the largest difference was at the minimal level; 79 percent of non-purists rated the campsite 'desirable', while 69 percent of purists found it desirable. This difference was not statistically significant, however. Generally, purists and non-purists evaluated tree damage impacts at campsites similarly.

The most consistent differences between purists and non-purists were in their evaluations of fire ring impacts (see Figure 9). Only at the minimal level did purists not differ significantly from non-purists. At the moderate level purists and non-purists did not differ in overall acceptability of the site (acceptable plus desirable responses), but the proportions rating the site 'desirable' did differ significantly. While 51 percent of non-purists thought the campsite with a moderate level of fire ring impact was desirable, only 35 percent of the purists felt the same. This difference was significant at the $p < .10$ level.

Purists and non-purists also differed in their evaluations of the campsite with a heavy degree of fire ring impact. The 10 percent difference in overall acceptability between purists and non-purists was not statistically significant, but the difference in 'desirable' responses was significant. Only 25 percent of purists thought the site was desirable, while nearly twice as many of the non-purists (49 percent) rated the campsite 'desirable'. That difference is significant at the $p < .01$ level.

At the severe level of fire ring impact purists again differed significantly from non-purists, this time in both desirability and overall acceptability of the site (see Figure 9). The difference in overall acceptability was significant at the $p < .05$ level, while the difference in desirability was significant at the $p < .01$ level.

One slide of the campsite with two fire rings present was also included. Once again, purists and non-purists differed significantly in their evaluations of the site conditions. While 24 percent of purists rated the site 'unacceptable', only 7 percent of the non-purists found it unacceptable - a difference that is significant at the $p < .01$ level.

Clearly then, while differences between purists and non-purists are not significant at every level of all three impacts, purists and non-purists do differ in their evaluations of campsite impacts. Purists had a mean A.S.I. of 28.0, while non-purists had a mean A.S.I. of 26.3. A t-test showed that this difference is significant at the $p < .02$ level. But perhaps more important, or at least more enlightening, than the overall measure that the A.S.I. gives are the individual differences among the different impacts and degrees of severity.

The second hypothesis concerning purists and non-purists was that purists would be more likely to differentiate between interior and peripheral sites in their evaluations of campsite conditions. Table 5 shows results of the four interior/peripheral comparisons for both purists and non-purists, together with previous results from the entire sample.

In each case, a larger proportion of purists than non-purists differentiated between the interior and peripheral sites in the hypothesized direction. The proportions of purists and non-purists making the hypothesized distinction were significantly different for three of the four comparisons.

It would seem, then, that of the respondents in this study, those with more purist attitudes and beliefs toward wilderness are more likely to conceptually zone wilderness into at least two regions (interior and peripheral) with respect to biophysical impacts. Purists seem more likely to have a stricter set of standards for campsite conditions in the wilderness interior than in the periphery, while non-purists are less likely to distinguish between the two 'zones'.

Slide Pair #	Entire Sample	Purists	Non-Purists
1	33.1	41.9	24.5
2	35.8	40.6	27.0
3	40.2	45.9	23.7
4	27.8	34.1	14.6

Table 5. Percentage of respondents finding campsite conditions acceptable in the Periphery but unacceptable in the Interior

Travel Method

It was hypothesized that hikers and horse-users would evaluate campsite impacts differently, with hikers holding to stricter standards than horse-users. As Figures 10 , 11 , and 12 show, results were not always consistent with this hypothesis. (n = 113 hikers; 57 horse-users.)

Hikers and horse-users responded similarly to most levels of bare ground impact (see Figure 10). The campsite with minimal bare ground was acceptable to a majority of both groups, but was 'desirable' to only 16 percent of horse-users and 22 percent of hikers. Moderate bare ground was desirable to only 5 percent and 9 percent of horse-users and hikers respectively. Overall acceptability for the site was 42 percent for horse-users, and 55 percent for hikers. This difference is not statistically significant, however.

The campsite with heavy bare ground impact was desirable to only 5 percent and 8 percent of horse-users and hikers respectively. Overall acceptability for the site was 47 percent for horse-users and 33 percent for hikers. This difference is significant at the $p < .01$ level. Equal proportions (81 percent) of each group rejected the site with severe bare ground as unacceptable. Generally, horse-users held slightly stricter standards for bare ground at campsites than did hikers, although the differences were statistically significant in only one case.

Responses to tree damage at campsites were not consistent with respect to travel method (see Figure 11). At the lower levels of impact (minimal and moderate) hikers and horse-users were in agreement as to the overall acceptability of the impact, but the sites were 'desirable' to significantly fewer hikers than horse-users. The campsite with minimal tree damage was desirable to 81 percent of horse-users, but to only 69 percent of hikers. This difference is significant at the $p < .10$ level. Likewise, the site with moderate tree damage was desirable to 81 percent of horse-users, but to only 65 percent of hikers -- a difference significant at the $p < .05$ level.

As the impact level reaches heavy, however, the results reverse themselves.

Figure 10. Hiker and Horse-User Curves

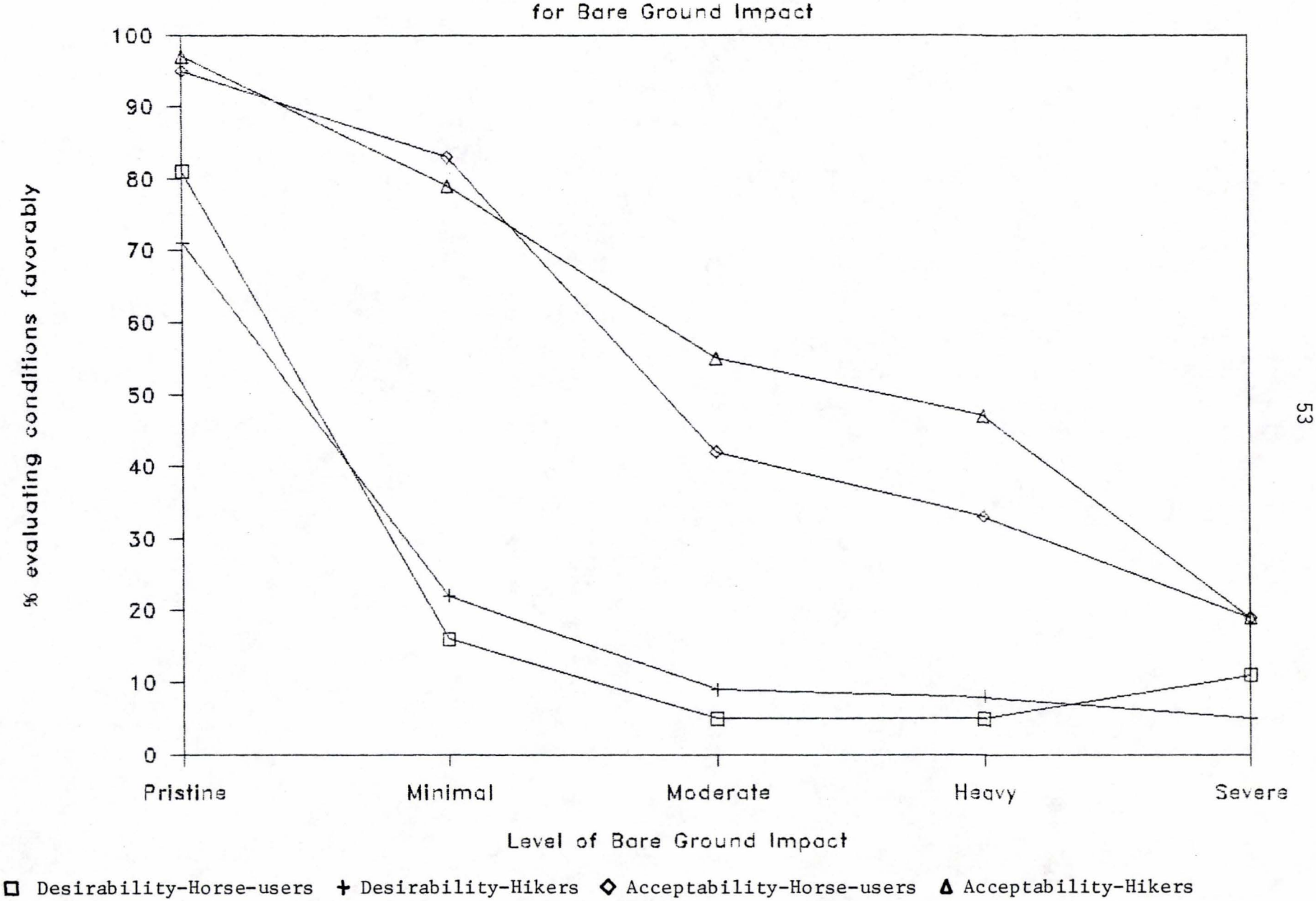


Figure 11. Hiker and Horse-User Curves

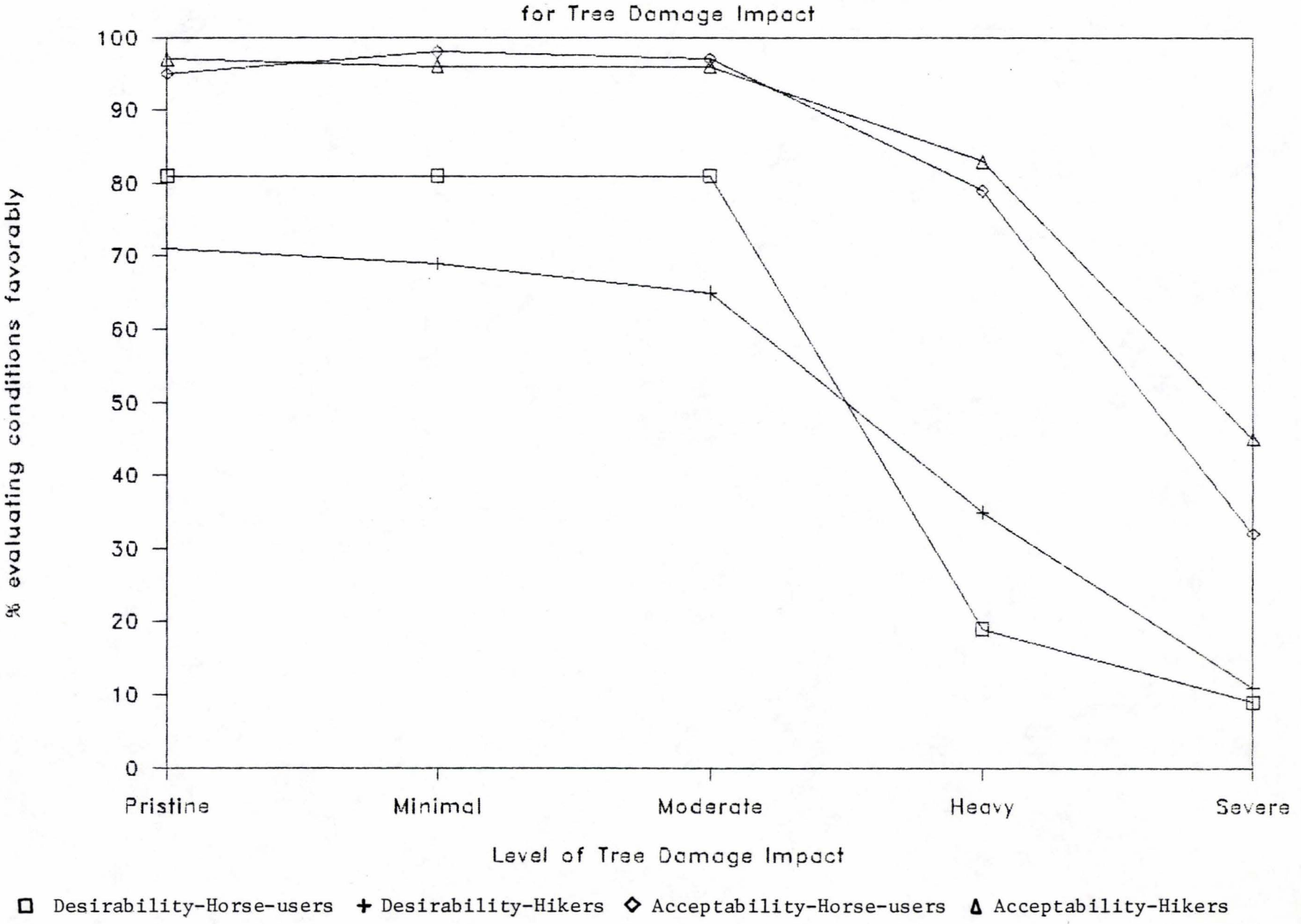
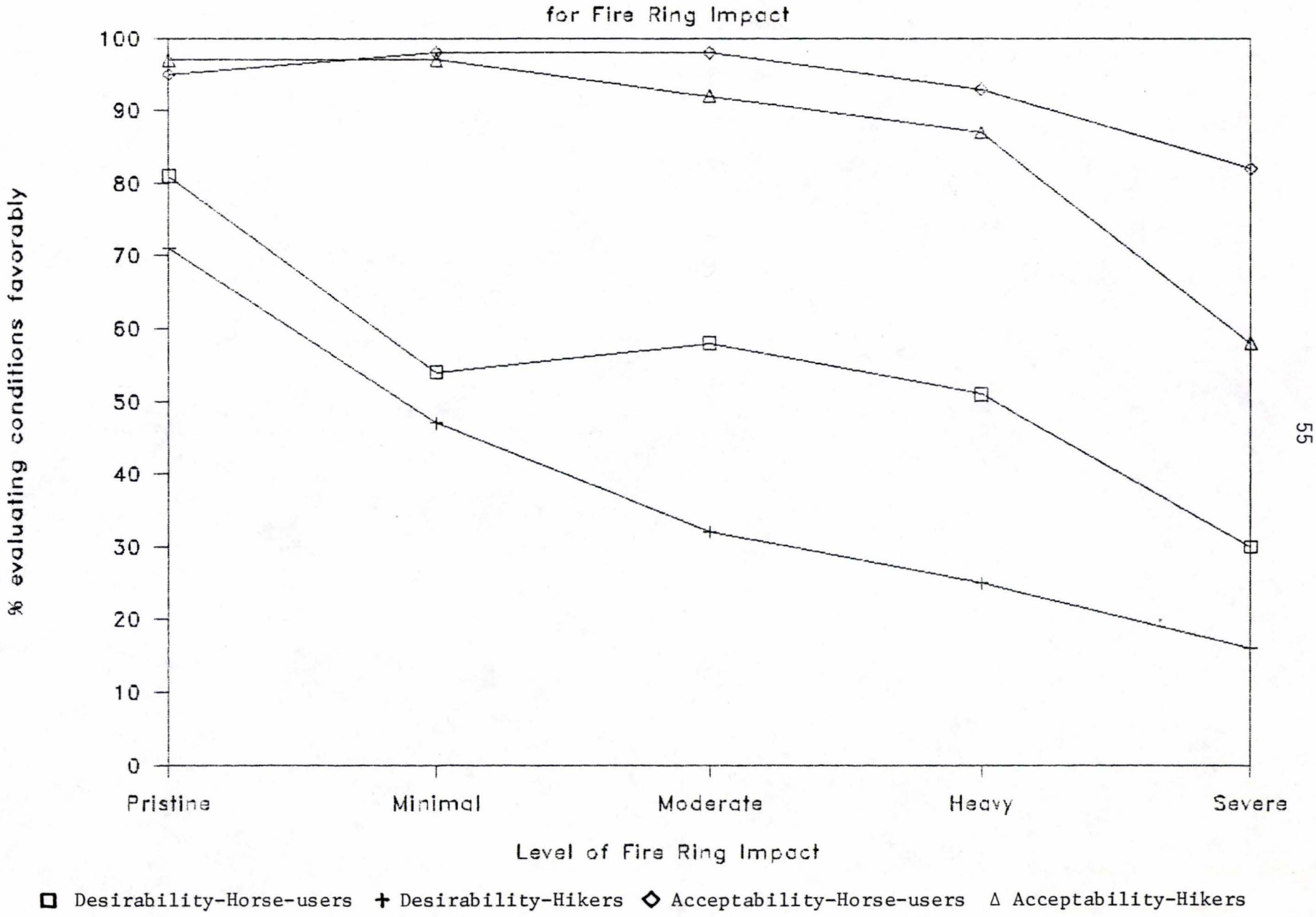


Figure 12. Hiker and Horse-User Curves



Thirty-five (35) percent of hikers rated the campsite with heavy tree damage 'desirable', yet only 19 percent of the horse-users did so. This difference is significant at the $p < .05$ level. The campsite with severe tree damage was deemed desirable by only 9 percent and 11 percent of horse-users and hikers respectively, but was acceptable to another 23 percent and 34 percent of each group. Thus 32 percent of horse-users responded favorably to the site, while 45 percent of hikers did the same -- a difference significant at the $p < .10$ level.

These results would suggest that hikers become sensitive to tree damage at a lower level of impact than do horse-users, but that once the tree damage passes a certain level horse-users find it more objectionable than do hikers. The first part of this finding makes sense; the latter part, however, seems intuitively suspect. As Figure 11 shows, the desirability curve for hikers drops more smoothly as the impact level increases, while the curve for horse-users displays a sudden steep drop as the impact level reaches 'heavy'.

Responses to fire ring impacts at campsites were consistent across all levels of impact and were consistent with the hypothesis posited. As Figure 12 shows, hikers held stricter standards for fire ring impacts across the spectrum of levels. Differences at the minimal level were not significant, but at the moderate level 58 percent of horse-users thought the site was desirable, compared to only 32 percent of hikers. This difference is significant at the $p < .01$ level.

Likewise, at the heavy impact level 51 percent of horse-users rated the campsite desirable, though only 25 percent of hikers agreed -- a difference that is significant at the $p < .001$ level. As the fire ring impact reached the severe level, 82 percent of horse-users still responded favorably to the campsite, compared to only 58 percent of hikers -- a significant difference at the $p < .01$ level. One slide of the campsite with two fire rings present elicited similar results. While 30 percent of horse-users found the campsite desirable, only 14 percent of hikers thought likewise, a difference that is significant at $p < .05$.

Thus horse-users were found to be more sensitive to bare ground impact than hikers, though the differences were significant only at the moderate level; while

hikers were more sensitive than horse-users to fire ring impacts at campsites, with the differences being significant at the moderate, heavy, and severe levels. Regarding campsites with tree damage, hikers were more sensitive than horse-users to lower levels of tree damage, but the reverse was true at the heavier levels.

Overall, hikers had slightly stricter standards, with a mean A.S.I. of 27.4; horse-users had a mean A.S.I. of 26.3. This difference can probably be attributed to hikers' stricter standards regarding fire rings. Similarly, hikers were slightly more purist than horse-users in their attitudes toward wilderness. The mean purism score for hikers was 35.7, while for horse-users it was 32.8.

The second hypothesis concerning travel method was that hikers would be more likely to differentiate between interior and peripheral sites in their evaluations of campsite conditions. Table 6 shows results of such comparisons, together with previous results.

In each case, a larger proportion of hikers than horse-users differentiated between the interior and peripheral sites in the hypothesized direction. The differences, however, were not statistically significant. It is not clear, then, whether or not hikers are more likely than horse-users to perceive and evaluate campsite conditions differently in the wilderness interior than the periphery, or whether a difference exists between these two groups with respect to conceptual zones in wilderness. Much more research, heavily funded, with numerous graduate students and recently graduated graduate students, will be needed in the near future to address this issue.

Level of Experience

It was hypothesized that experienced wilderness users would evaluate campsite impacts differently than inexperienced users, with the more experienced users holding stricter standards of acceptability than inexperienced users. Experienced users were arbitrarily defined as those users who had spent twenty (20) or more days in the wilderness in the past two years; inexperienced users were defined as

Slide Pair #	Entire Sample	Hikers	Horse-users	Purists	Non-Purists
1	33.1	36.3	27.3	41.9	24.5
2	35.8	41.7	26.9	40.6	27.0
3	40.2	45.7	28.0	45.9	23.7
4	27.8	31.3	21.2	34.1	14.6

Table 6. Percentage of respondents finding campsite conditions acceptable in the Periphery but unacceptable in the Interior

those who had spent 0 to 5 days in the wilderness in the past two years. (n = 74 experienced users; 53 inexperienced) As Figures 13 , 14 and 15 show, results were somewhat, though not entirely, consistent with this hypothesis.

While experienced and inexperienced users agreed on the desirability of the campsites with bare ground, there was less agreement with respect to overall acceptability of those sites (see Figure 13). Fifty-seven (57) percent of the inexperienced users rated the site with moderate bare ground either desirable or acceptable, but only 43 percent of the experienced users did the same, a fairly substantial but not statistically significant difference. At the heavy level of bare ground impact 53 percent of inexperienced users responded favorably to the site; only 35 percent of experienced users thought it acceptable or desirable. This difference was significant at $p < .05$. Overall acceptability of the site with severe bare ground impact was 26 percent for inexperienced users, and 15 percent for experienced visitors, a difference that was not statistically significant.

Results from the slides of campsites with tree damage are inconsistent with those of the bare ground sites (see Figure 14). Experienced and inexperienced users agreed on the overall acceptability of the sites with tree damage, but opinions varied on the desirability of the sites. The campsite with a moderate amount of tree damage was evaluated as desirable by 75 percent of experienced users, but only 60 percent of inexperienced users, a difference that is significant at the $p < .10$ level. This was the only level of tree damage about which experienced and inexperienced users disagreed.

Evaluations of the campsites with fire rings resulted in differences at the two extremes of the range of impact level (see Figure 15). The site with a minimal fire ring was perceived as desirable by 55 percent of experienced users, but by only 40 percent of inexperienced users. This difference was significant at $p < .10$. At the other extreme, the reverse was true. While 26 percent of inexperienced visitors thought the site was desirable, only 12 percent of the experienced users agreed. This difference was significant at the $p < .05$ level.

This would suggest that perhaps experienced visitors have come to expect some

Figure 13. Experienced/Inexperienced

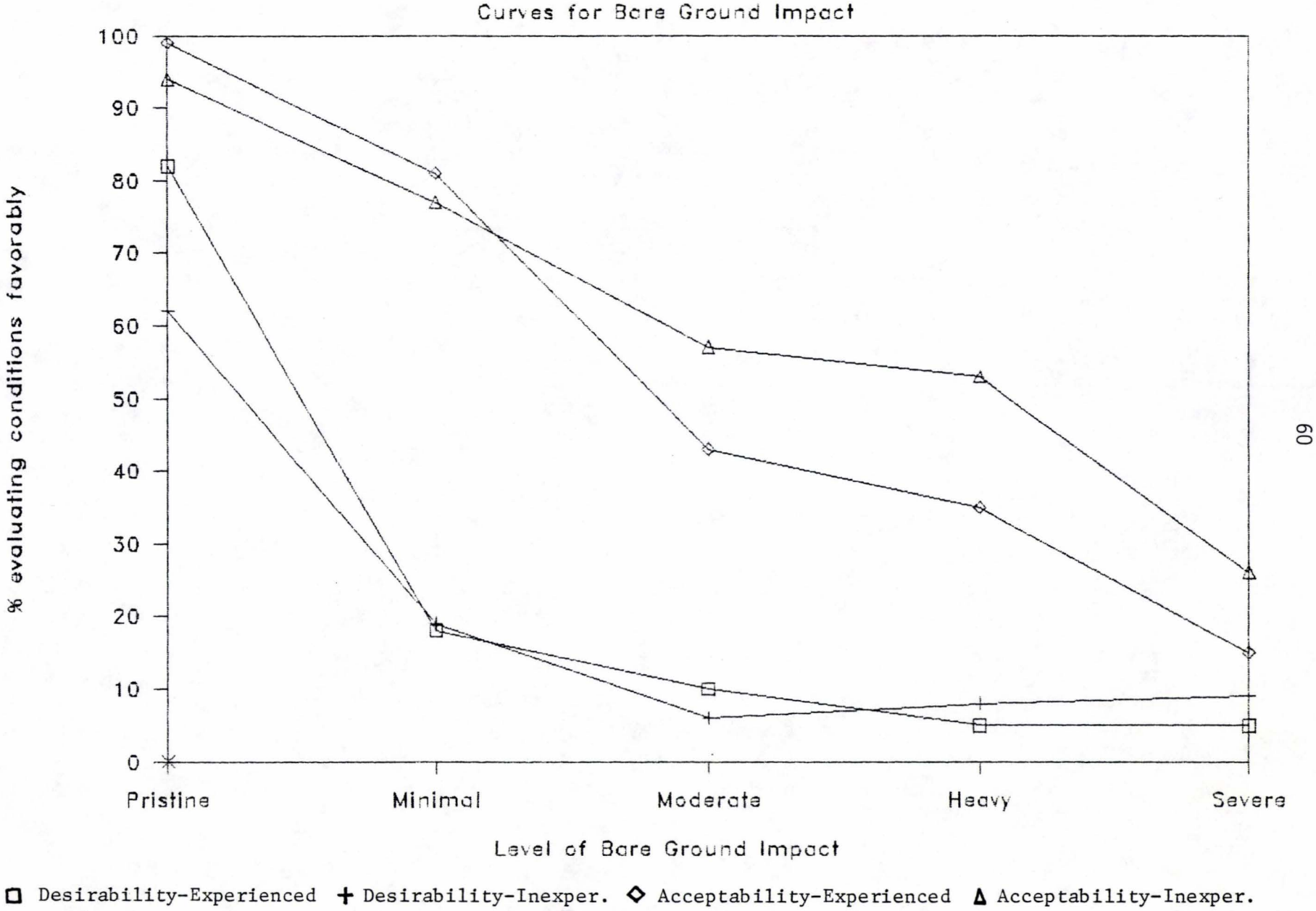


Figure 14. Experienced/Inexperienced

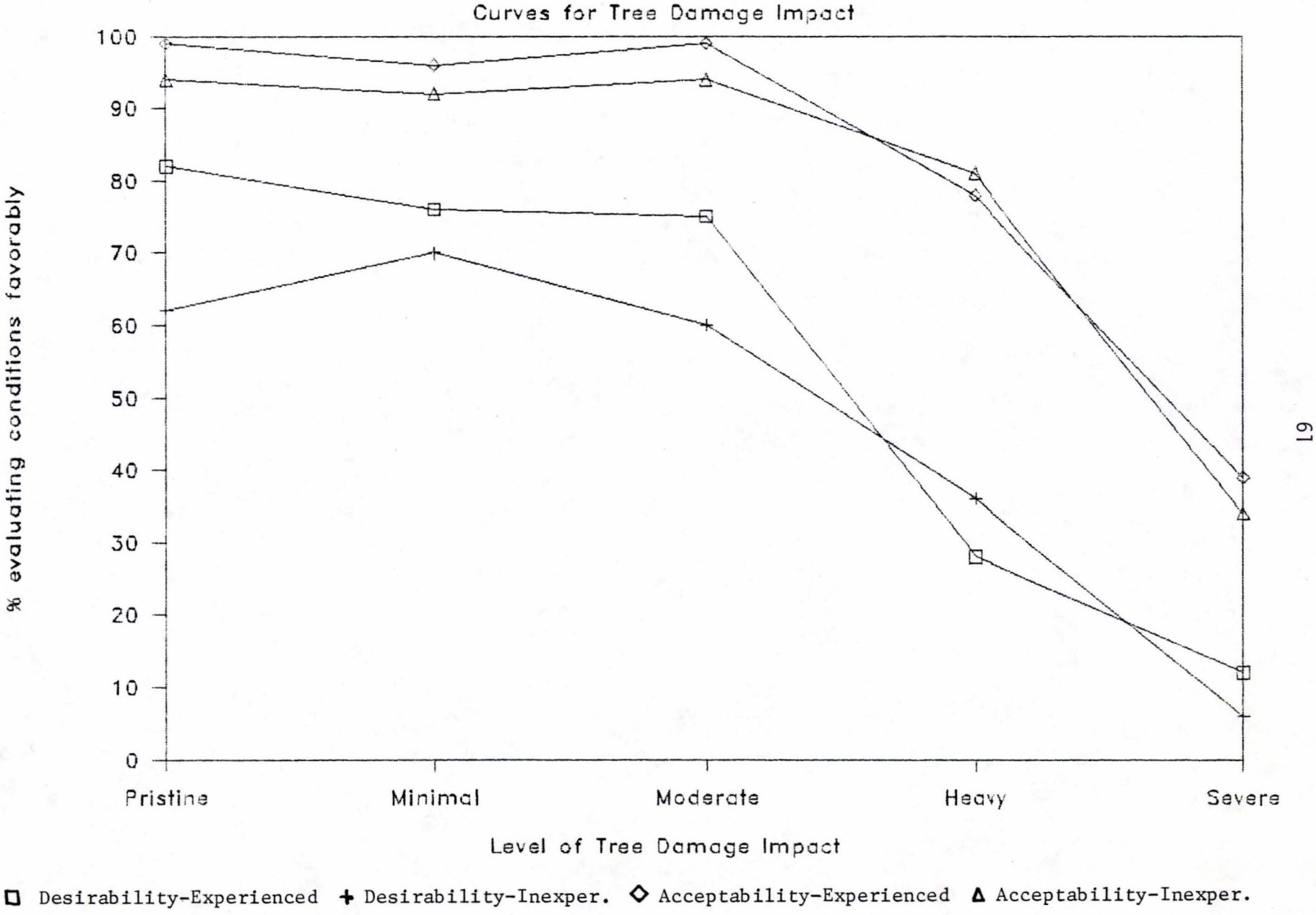
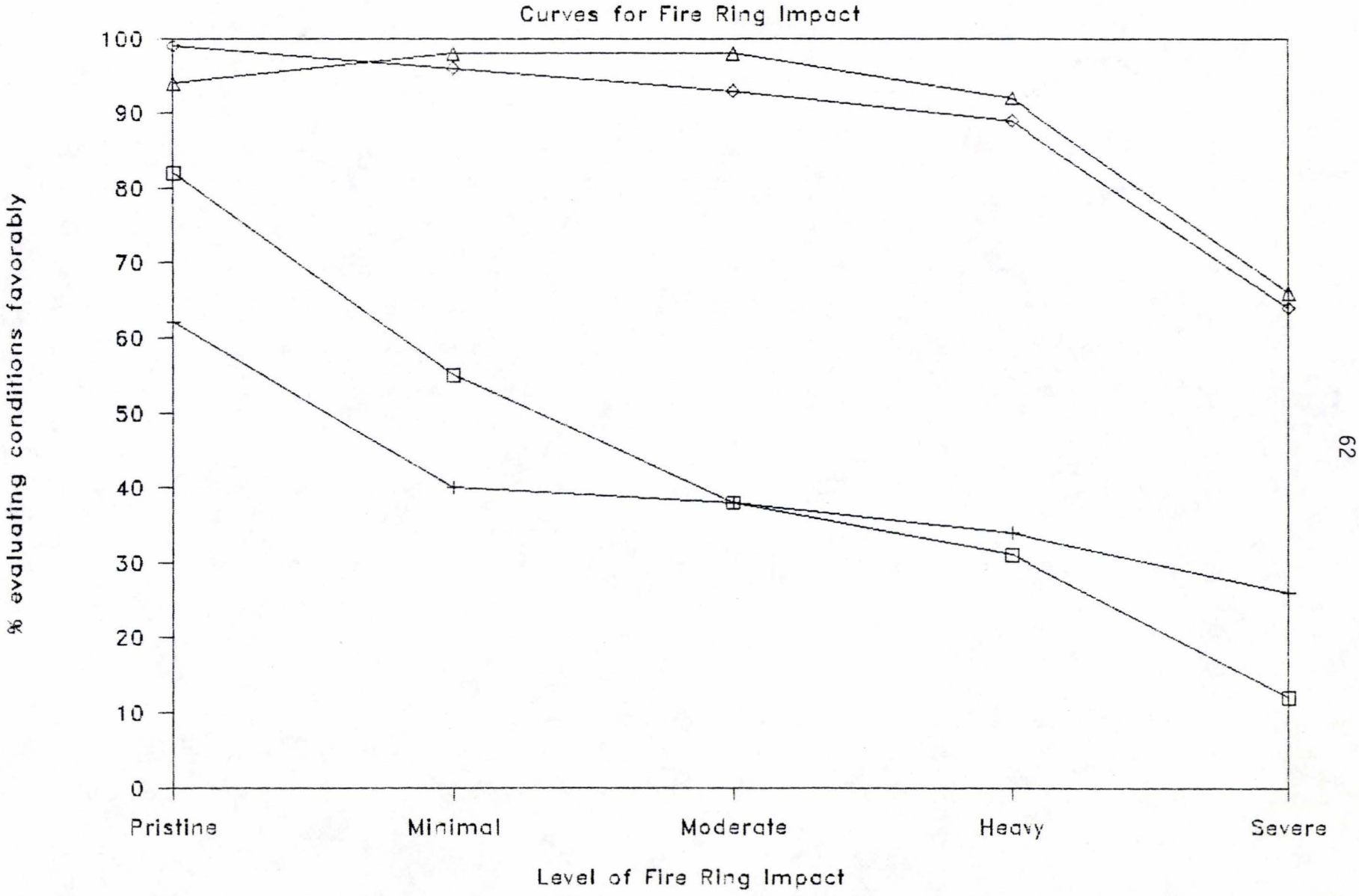


Figure 15. Experienced/Inexperienced



fire ring impact at campsites, and are not too bothered by a small fire ring; as the impact level reaches severe, however, the desirability of the site drops more quickly for experienced than for inexperienced users. Experienced and inexperienced users agreed on the overall acceptability of all levels of fire ring impact.

In summary, then, the results of comparing experienced with inexperienced users are not clear enough to be able to positively state that experienced users hold stricter standards of acceptability for campsite impacts than inexperienced users. It would appear that experienced users are more likely than inexperienced users to reject a campsite with moderate to severe amounts of bare ground, or to find severe fire ring impact undesirable. In most other cases, however, there was close agreement. And for minimal fire ring impact and moderate tree damage, inexperienced users found the sites less desirable than experienced visitors.

The second hypothesis concerning level of experience was that experienced users would be more likely to differentiate between interior and peripheral campsites, evaluating conditions at interior sites as less acceptable than equal conditions at peripheral sites. The results of four such comparisons, together with previous results, are shown in Table 7 .

In each case, a larger proportion of experienced users perceived conditions at the interior site as less acceptable than at the peripheral site. In the case of the first two pairs, the differences between experienced and inexperienced users is significant at $p < .05$. The latter two pairs, however, show no significant differences between experienced and inexperienced visitors. The evaluations by inexperienced users of the third and fourth pairs seem to be inconsistent with their evaluations of the first two pairs, and with previous results. Therefore, despite the fact that only two of the four comparisons resulted in statistically significant differences, it would seem that experienced users are indeed more likely than inexperienced users to conceptually zone wilderness, and to perceive campsite impacts as less acceptable in the interior than in the periphery.

An additional question that was explored in this study was whether or not

Slide Pair #	Entire Sample	Experienced	Inexperienced	Hikers	Horse-users	Purists	Non-Purists
1	33.1	42.0	21.2	36.3	27.3	41.9	24.5
2	35.8	47.4	21.4	41.7	26.9	40.6	27.0
3	40.2	42.2	40.0	45.7	28.0	45.9	23.7
4	27.8	31.8	29.6	31.3	21.2	34.1	14.6

Table 7. Percentage of respondents finding campsite conditions acceptable in the Periphery but unacceptable in the Interior

wilderness campers might choose to camp at a less scenic site that was less impacted as opposed to a more scenic site that was also more heavily impacted. In other words, would campers be willing to "trade-off" scenery for a more pristine campsite?

Respondents (n = 108) viewed two slides, side by side; one of a heavily or severely impacted campsite in a more scenic location, the other of a minimally impacted campsite in a less scenic location. They were asked to indicate which of the two campsites they would prefer camping at. Four such comparisons were performed, the results of which are displayed in Table 8 .

In each case, a larger proportion of respondents chose the less scenic campsite with less impact over the more scenic but more heavily impacted site. This suggests that campers do value a campsite that is not badly impacted, and may be willing, if properly informed or educated, to choose sites that are less susceptible to impact even though they may be less scenic.

Table 9 summarizes the study hypotheses, along with general conclusions and important findings about each.

Pair #	Site Description	Responses (in %) (n=108)
1	a. less scenic; minimal bare ground impact	59 *
	b. scenic; heavy bare ground impact	41
2.	a. less scenic; minimal tree damage impact	52
	b. scenic; heavy tree damage impact	48
3.	a. less scenic; minimal bare ground impact	70 **
	b. scenic; severe bare ground impact	30
4.	a. less scenic; minimal tree damage impact	78 **
	b. scenic; severe tree damage impact	22

* denotes difference is significant at $p < .10$

** denotes difference is significant at $p < .001$

Table 8. Scenery vs. Impact comparisons

TABLE 9

Summary Table of Study Hypotheses and Conclusions

Study Hypothesis	Conclusion
H1: Evaluations will differ among the three impacts.	Supported. Only 4 of 24 possible comparisons for desirability and overall acceptability were not significantly different.
H2: Acceptability of each impact will vary according to the severity of the impact.	Generally supported. Minimal and moderate levels of tree damage did not differ; minimal through heavy levels of fire ring impact did not differ. Acceptability of all three impacts did decrease, though, as impact level increased.
H3: Visitors will evaluate interior and peripheral campsite conditions differently.	Generally supported. Approximately 34 percent of respondents who found peripheral campsite conditions acceptable evalauted the same conditions as unacceptable in the interior zone.
H4a: Purists will evaluate campsite impacts as less acceptable than will non-purists.	Generally supported. While purists generally held stricter standards, many differences were not significant. Overall A.S.I. scores were significantly different.
H4b: Purists are more likely than non-purists to distinguish between interior and peripheral campsite conditions.	Supported. Three of the four interior/peripheral comparisons showed statistically significant differences in the hypothesized direction.
H5a: Hikers will evaluate campsite impacts as less acceptable than will horse-users.	Generally unsupported. Findings were inconsistent for bare ground and tree damage; hikers did find fire rings less acceptable than did horse-users.
H5b: Hikers are more likely than horse-users to distinguish between interior and peripheral campsite conditions.	Generally supported. All differences were in the hypothesized direction, but were not statistically significant due to small sub-sample size.
H6a: Experienced visitors will evaluate campsite impacts as less acceptable than inexperienced visitors.	Generally unsupported. At specific levels of certain impacts (particularly bare ground) experienced visitors did hold stricter standards. Generally, though, differences were not significant.

TABLE 9 (cont.)

Study Hypothesis	Conclusions
H6b: Experienced visitors are more likely than inexperienced visitors to distinguish between interior and peripheral campsite conditions.	Generally supported. All differences were in the hypothesized direction; two of the four were statistically significant.

MANAGER RESULTS and DISCUSSION

Results from Group 8 -- BLM managers -- are presented in this chapter. In cases where managers were asked the same questions as visitors, or were asked to respond to the same slides, results will be compared.

First some summary statistics -- scores on the purism scale ranged from 26 to 45; the median fell between 34 and 35, as it did for visitors. Fifty (50) percent of the managers went on between 4 and 12 trips into a wilderness in the two years previous to the study. The median category for number of days spent in the wilderness over the previous two years was 11 to 20; the mode response was 21 to 40 days. Generally, managers took a few more trips each year than did visitors, but visitors averaged slightly longer trips. Managers were hikers -- 91 percent hiked on their wilderness trips; the remaining 9 percent were split equally between horse-users and boaters. Fifty two (52) percent of the managers said they were members of a conservation or environmental organization, about the same percentage as for visitors.

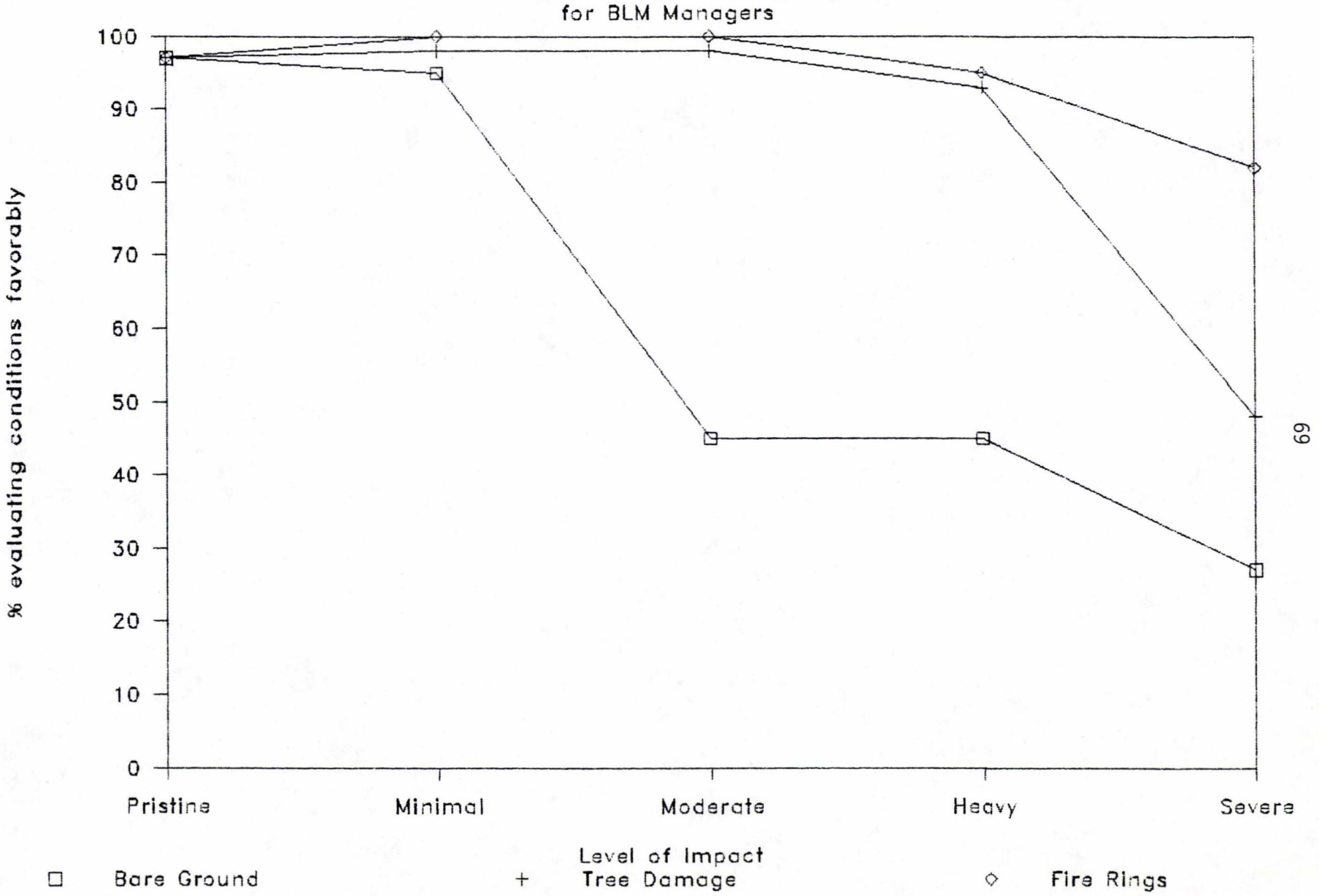
Managers were asked to evaluate the same 14 campsite slides that visitors were shown, and rate the acceptability of the campsite conditions. Overall acceptability curves (acceptable and desirable responses) for each of the three impacts are shown in Figure 16 .

From the results in Figure 16, managers clearly found bare ground to be the least acceptable of the three impacts. There would seem to be an intrinsic point at which bare ground impact becomes unacceptable, as evidenced by the sharp decline of the curve between the minimal and moderate levels of bare ground impact.

Similarly tree damage is seen as acceptable up to a certain point (heavy), and then at the severe level its acceptability falls off sharply. Fire rings were unacceptable to only 18 percent of managers even at the severe level.

The overall acceptability curves for BLM managers were fairly similar to those of visitors. The largest differences were for minimal bare ground and severe fire ring

Figure 16. Overall Acceptability Curves



damage. While 95 percent of managers considered the campsite with minimal bare ground acceptable or desirable, only 80 percent of visitors thought so, a difference significant at $p < .05$. And while 82 percent of managers evaluated the campsite with a severe level of fire ring impact favorably, only 67 percent of visitors agreed, a difference significant at $p < .10$.

The overall measure of impact acceptability (A.S.I.) for managers was 24.4 (mean); visitors had a mean A.S.I. of 27.0 . A t-test showed these two means to be significantly different at $p < .000$. This means that overall, visitors had stricter standards of acceptability than did managers for the three campsite impacts in this study, although most individual differences were small.

A Spearman's rho correlation matrix was constructed for the variables A.S.I., 'purism', and 'days' (experience). Results were similar to those found for the visitor sample -- purism correlated significantly with A.S.I., while 'Days' did not. In other words, the attitudes and beliefs held by managers had a greater effect on their acceptability standards than did the amount of time they spent in the wilderness.

Managers were also asked to view the same fourteen slides again, and rate the amount of impact they felt was present at the site. Choices were none, minimal, moderate, heavy, and severe. A Spearman's rho correlation analysis revealed that ratings of amount of impact correlated significantly ($p < .10$) with ratings of acceptability for only 8 of the 14 sites. There was no apparent trend with respect to the type or level of impact that would explain why certain correlations were significant and others were not. A similar analysis performed for visitors ($n = 74$) found 13 of the 14 correlations significant at the $p < .05$ level. Apparently, the relationship between the amount of impact perceived and the acceptability of the site conditions is stronger for visitors than it is for managers. Managers may be considering other factors besides perceived amount of impact when evaluating the acceptability of campsite conditions.

An additional experiment was undertaken with the sample of BLM managers. Eight slides of campsites with varying combinations of impacts were shown to the managers, who were asked to respond in terms of the management strategy or

action they would recommend for the site. The sites were described as being on the way to, but not at, a popular destination in the wilderness, and used only by backpackers. Response choices were displayed as a spectrum, including (in order) 'No Action', 'User Education', 'Rehabilitation', and 'Close to all Use'. Respondents could place a mark along the line provided; for coding purposes points along the line were later assigned values from 1 to 13.

Table 10 shows the results of this experiment. A campsite impact rating was computed for each site. This rating was based on the level of the impacts present at each site; the higher the rating the more heavily impacted the site. Moderate through severe levels of bare ground were weighted 2x in computing the campsite impact ratings; this was done so that campsite impact ratings corresponded with managers' perceptions of the acceptability of bare ground compared to acceptability of the other impacts (see again the results in Figure 16). A Management Strategy Index (M.S.I.) was then computed for each site based on manager responses. This index has a range from 1 to 13, and corresponds to the gradient of response choices provided for the managers. An M.S.I. rating of 1 corresponds to the response, or management strategy, 'No Action'; 5 to 'User Education'; 9 to 'Rehabilitation'; and 13 to 'Close to all use'. The mean, median, and mode responses are all shown in Table 10.

A visual inspection of the results in Table 10 reveal an almost perfect correlation between the campsite impact rating and the corresponding M.S.I. In other words, the management strategy chosen by managers was very closely, indeed nearly perfectly, linked to the amount of impact present at the campsite. 'Light-handed' techniques were chosen for the campsites with relatively little impact. As the impact at the site became heavier, a more active or 'heavy-handed' management approach was chosen by managers.

Site #	Campsite Impact Rating	Management Strategy Index (mean)	M.S.I. median	M.S.I. mode
1	9	8.2	8/9	9
2	1	3.0	2/3	2
3	6	7.8	8+	9
4	3	5.9	5+	5
5	12	10.2	10+	9-13
6	7	8.3	8/9	9
7	2	5.2	4/5	5
8	12	10.9	11-	11

Table 10. Management Strategies for Eight Campsites

CONCLUSIONS

Summary of Study

Indirect, artistic representations of impacted campsites were used in a study to determine how wilderness visitors perceive campsite impacts. This type of representation was used to control factors extraneous to the type and level of impact present.

The study was conceived as a series of experiments, each targeted to a different aspect of visitor perceptions of impacts. Locally available groups of users and students responded to and evaluated varying levels of bare ground, tree damage, and fire ring impact at wilderness campsites.

The experiments included 1) measuring visitors' acceptability standards for the three impacts; 2) determining the relative importance of the three impacts; 3) determining if visitors evaluated campsite conditions in the wilderness interior differently from those in the wilderness periphery; 4) determining the extent to which the perceived amount of impact at a campsite correlated with the acceptability of the campsite conditions; 5) determining whether visitors might be willing to "trade" a more scenic campsite for one that is less impacted; and 6) determing the effect that independent variables such as amount of experience, travel method, and purist attitudes have on perceptions and evaluations of campsite impacts.

It was hypothesized that evaluations of acceptability would differ among the three impacts, and that acceptability would vary for each impact according to the degree of severity. It was also hypothesized that respondents would differentiate between interior and peripheral campsites, displaying stricter standards for the interior sites. Furthermore, it was hypothesized that some types of visitors -- purists, hikers, and experienced users -- would 1) have stricter standards of acceptability; and 2) be more likely than non-purists, horse-users, and inexperienced users to differentiate between the interior and peripheral campsites.

Major Findings and Management Implications

Bare ground was found to be the least acceptable of the three impacts; fire rings were most acceptable. Visitors and managers agreed on this order of relative importance. Bare ground was undesirable to most respondents at the minimal level, and was unacceptable above the moderate level.

This can be interpreted as a clear rationale for using bare ground as an indicator to monitor changes in the biophysical environment. It also, unfortunately, places managers in a difficult position, as bare ground is a difficult impact to control or minimize. However, judging from the Desirability curve for bare ground (see Figure 4), the presence of even minimal bare ground is enough to make a campsite undesirable; desirability doesn't drop significantly between the minimal and severe levels.

The implication is that if the presence of bare ground has more of an effect on desirability of the site than the amount of bare ground, managers should encourage visitors to concentrate use on fewer sites. This would keep to a minimum the number of sites impacted with bare ground, and minimize the total amount of area disturbed. This makes sense, too, in light of the difficulty of rehabilitating campsites that already show heavy bare ground impact.

Heavy tree damage was undesirable to most respondents, but only severe tree damage was unacceptable. All levels of fire ring impact were undesirable, but none were unacceptable. (See Appendix E for table of potential standards.)

Attitudes toward wilderness were found to have significant and consistent effects on perceptions and evaluations of campsite impacts, more so than either experience level or travel method. This implies that the attitudes of the visitor population for a particular area may have an effect on the standards set for that area. If visitors generally hold more purist attitudes, managers may consider setting standards that are more restrictive than might otherwise be set. But if purist visitors, or visitors with more restrictive standards, are displaced from an area, that doesn't mean managers have reason to lower the standards for the area.

One cautionary note, however -- visitor perceptions should be only one of several (or many) criteria on which standards should be set. Standards based solely on visitor perceptions might, in some cases, be too lax for wilderness designation, or in other cases be too strict to be realistic and achievable. Resource protection needs and management objectives should play an integral role in setting standards, and at no time should standards be set that would allow degredation of the resource.

Significant differences of opinion with each of the three typologies of users (purism, experience, and travel method), were most likely to be 1) over the desirability of conditions, rather than acceptability; 2) about moderate and heavy levels of the impacts as opposed to the extremes (minimal and severe); and 3) over fire ring impact more than bare ground or tree damage.

This suggests that 1) managers should set standards for conditions with desirability in mind, as opposed to minimally acceptable standards; 2) since most users agree that minimal impacts are acceptable, and severe impacts are unacceptable, managers should stress this commonality and then try to build concensus among users on standards in the 'middle ground'; and 3) since users are in disagreement most about fire rings, particularly the desirability or undesirability of their presence, managers should weigh most heavily the more restrictive standards of purists and hikers. Every fire ring may not need to be destroyed, but efforts should definitely be made to keep the numbers and size of fire rings to a minimum.

Some support was found for the concept of a Recreation Opportunity Spectrum in wilderness. Overall, about one-third of the respondents who found conditions acceptable for a peripheral campsite evaluated those same conditions as unacceptable for a campsite in the interior. Purists, hikers, and experienced users were more likely to make the differentiation, with upwards of 45 percent of these users having stricter standards for interior campsites. In light of these results, dual standards were determined for each impact (see Appendix E).

Contrary to results of previous studies regarding social attributes of recreational

engagements, experience was not a strong, or at least consistent, influence on evaluations of biophysical attributes such as campsite impacts. Experienced users were less accepting of moderate to heavy bare ground impact than were inexperienced users, but there was general agreement on the acceptability and desirability of most levels of the three impacts.

Tentative support was found for the notion that visitors may be willing to give up somewhat more scenic campsites for less scenic sites that are in better shape. This, together with the well documented fact that wilderness users are a highly educated group, should encourage managers to educate visitors about choosing campsites that are more resistant to impact, even if such sites may be in less scenic locations.

When results from the sample of visitors are compared to those of managers, most of the differences are not significant. Overall, visitors did have stricter standards of acceptability than managers, but individual differences were significant in only two cases: acceptability of minimal bare ground and severe fire ring impact. Any conclusions drawn from these results should be viewed as tentative, however, as the sample size for managers was only 44, and the visitor and manager populations came from somewhat different geographic areas. As more data for managers are collected, results may become clearer.

Further Research Needs

The logical next step in studying visitor perceptions of campsite impacts would be a field validation of the results of this study. Also, the effect of other factors or independent variables such as expectations, motivations, and desired experience outcomes on acceptability of campsite impacts could be tested.

LITERATURE CITED

Bultena, G.L., D. Field, P. Womble, and D. Albrecht. 1981. Closing the gates: A study of backcountry use-limitation at Mount McKinley National Park. Leisure Sciences 4(3): 249-267.

Carroll, Peter N. 1972. Puritans and the Transformation of the Wilderness. in Environment and Americans. ed. Roderick Nash. Robert E. Krieger Publ. Co., New York.

Cole, David N. 1981. Vegetational changes associated with recreational use and fire supression in the Eagle Cap Wilderness, Oregon: some management implications. Biological Conservation 20(4):247-270.

Cole, David N. 1982. Wilderness campsite impacts: effect of amount of use. Research Paper INT-284. Ogden, UT: USDA Forest Service, Intermountain Research Station. 34 p.

Cole, David N. 1983. Campsite conditions in the Bob Marshall Wilderness, Montana. Research Paper INT-312. Ogden, UT: USDA Forest Service, Intermountain Research Station. 18 p.

Cole, David N. 1985a. Recreational trampling effects on six habitat types in western Montana. Research Paper INT-350. Ogden, UT: USDA Forest Service, Intermountain Research Station. 43 p.

Cole, David N. 1985b. Management of ecological impacts in wilderness areas in the United States. In: Bayfield, N.G. and Barrow, G.C., eds. The ecological impacts of outdoor recreation on mountain areas in Europe and North America. R.E.R.G. Report No. 9. Wye, England: Recreation Ecology Research Group. pp. 138-154.

Cole, David N. and Richard K. Fichtler. 1983. Campsite impact on three western wilderness areas. Environmental Management 7(3): 275-288.

Ditton, R.B., A.J. Fedler, and A.R. Graefe. 1982. Assessing recreational satisfaction among diverse participant groups. In: Forest and River Recreation: Research Update, pp. 134-139. University of Minnesota Agricultural Experiment Station. Miscellaneous Publication 18. St. Paul.

Ditton, R.B., A.J. Fedler, and A.R. Graefe. 1983. Factors contributing to perceptions of recreation crowding. Leisure Sciences 5(4): 273-286.

Federal Register. 1982 Rules and regulations: national forest system and resource management planning. 47: 7690.

Frissell, Sidney S., Jr., and Donald P. Duncan. 1965. Campsite preference and detioration in the Quetico-Superior canoe country. J.For. 63(4): 256-260.

Graefe, A.R., J.J. Vaske, and F.R. Kuss. 1984. Social carrying capacity: an integration and synthesis of twenty years of research. Leisure Sciences 6(4): 395-431.

Heberlein, T.A., and P. Dunwiddie. 1979. Systematic observation of use levels, campsite selection, and visitor characteristics at a high mountain lake. Journal of Leisure Research 11(4): 307-316.

Hendee, J.C., W.R. Catton, Jr., L.D. Marlow, and F.C. Brockman. 1968. Wilderness users in the Pacific Northwest -- Their characteristics, values, and management preferences. Research Paper PNW-61. Portland, OR: USDA Forest Service, Pacific Northwest Research Station. 92 p.

Hendee, John C., George H. Stankey, and Robert C. Lucas. 1978. Wilderness Management. Misc. Publication No. 1365. Washington, D.C.: U.S. Dept. of Agriculture, Forest Service. 381 p.

Hendee, John C., and Robert M. Pyle. 1971. Wilderness managers, wilderness users: a problem of perception. Naturalist 22(3): 22-26.

Kelley, M.D. 1979. Individual and social motive factors influencing recreation participation in the Rattlesnake backcountry. Unpublished M.S. Thesis. University of Montana, Missoula.

Lee, Robert G., 1975. The management of human components in the Yosemite National Park ecosystem. Final Report prepared for the Yosemite Institute, Yosemite National Park, CA, for the USDI National Park Service, San Francisco, CA, 134 p.

Lime, David W., and George H. Stankey. 1971. Carrying Capacity: maintaining outdoor recreation quality. In: The Forest Recreation Symposium Proceedings. Syracuse, NY; Oct. 12-14, 1971, p. 174-184. USDA Forest Service, Northwest Forest Experiment Station.

Lucas, Robert C. 1964. The recreational capacity of the Quetico-Superior area. Research Paper LS-15. St. Paul, MN: USDA Forest Service, North Central Forest Experiment Station. 34 p.

Lucas, Robert C. 1970. User evaluation of campgrounds on two Michigan National Forests. USDA Forest Service Research Paper NC-44. North Central Forest Experiment Station, St. Paul, MN. 15 p.

Lucas, Robert C. 1979. Perceptions of non-motorized recreational impacts: A review of research findings. In Recreational Impact on Wildlands: Conference Proceedings. Seattle, WA, Oct. 27-29, 1978, p. 24-31. USDA Forest Service, Pacific Northwest Region, R-6-001-1979.

Lucas, Robert C. 1980a. Campsite impact perceptions. Unpublished study plan. 19 p. Review draft.

Lucas, Robert C. 1980b. Use patterns and visitor characteristics, attitudes and preferences in nine Wilderness and other roadless areas. Research Paper INT-253. Ogden, UT: USDA Forest Service, Intermountain Research Station. 89 p.

Lucas, Robert C. 1985. Visitor characteristics, attitudes, and use patterns in the Bob Marshall Wilderness Complex, 1970-1982. Research Paper INT-345. Ogden, UT: USDA Forest Service, Intermountain Research Station. 32 p.

Lucas, Robert C., David N. Cole, and George H. Stankey. 1985. Research Update: what we have learned so far about wilderness management. In: Issues in Wilderness Management, Michael Frome, ed., pp. 173-188, Westview Press, Boulder, CO, publ. in cooperation with The Wilderness Research Center, Univ. of Idaho, Moscow. 252 p.

Marshall, George. 1969. In: Wilderness and the quality of life, p. 13-15. M.E. McCloskey and J.P. Gilligan, eds. Sierra Club, San Francisco.

Martin, Steven R. 1985. Unpublished data. School of Forestry, Univ. of Montana, Missoula, MT.

McCool, Stephen F. 1984a. Satisfaction and solitude in wilderness recreation settings: another look. Unpublished manuscript. School of Forestry, Univ. of Montana, Missoula, MT.

McCool, Stephen F. 1984b. A further evaluation of the multiple attribute saliency theory of satisfaction in recreational settings. Technical Completion Report submitted to Intermountain Research Station, Missoula, MT. 72 p.

Merigliano, L.L., and Krumpe, E.E. n.d. The identification and evaluation of indicators to monitor wilderness conditions: Report to participants of a Delphi study. University of Idaho: Forest, Wildlife and Range Experiment Station. 32 pp.

Merriam, L.C., Jr., and C.K. Smith. 1974. Visitor impact on newly developed campsites in the Boundary Waters Canoe Area. J. For. 72(10): 627-630.

Nash, Roderick. 1982. Wilderness and the American Mind. Third Edition. Yale Univ. Press.

Nielson, J.M., B. Shelby, and J.E. Hass. 1977. Sociological carrying capacity and the last settler syndrome. Pacific Sociological Review 20(4): 568-581.

Petersen, Margaret. 1981. Trends in recreational use of National Forest Wilderness. Research Paper INT-319. Ogden, UT: USDA Forest Service, Intermountain Research Station. 3 p.

Peterson, George L. 1974. A comparison of the sentiments and perceptions of wilderness managers and canoeists in the Boundary Waters Canoe Area. J. Leisure Research 6(3): 194-206.

Public Law 88-577. The Wilderness Act. p. 890-896 in U.S. Statutes At Large.

Schreyer, Richard. 1976. Sociological and political factors in carrying capacity decision making. In: Proceedings of the Third Resources Management Conference, pp. 228-258. USDI National Park Service, Southwest Region, Fort Worth, Texas.

Schreyer, Richard. 1982. Experience level affects expectations for recreation participation. In: Forest and River Recreation: Research Update, pp. 154-159. University of Minnesota Agricultural Experiment Station. Miscellaneous Publication 18. St. Paul.

Schreyer, Richard, and M.L. Nielson. 1978. Westwater and Desolation canyons: whitewater river recreation study. Institute for the Study of Outdoor Recreation and Tourism. Utah State University.

Schreyer, Richard, David W. Lime, and Daniel R. Williams. 1984. Characterizing the influence of past experience on recreation behavior. Journal of Leisure Research 16(1): 34-50.

Shelby, B. 1980. Crowding models for backcountry recreation. Land Economics 56(1): 43-55.

Shelby, B. 1981. Encounter norms in backcountry settings: studies of three rivers. Journal of Leisure Research 13(2): 129-138.

Shelby, B., and R.B. Colvin. 1982. Encounter measures in carrying capacity research: actual, reported, and diary contacts. Journal of Leisure Research 14(4): 350-362.

Shelby, B., and Richard Harris. 1982. Evaluating methods for measuring visitor perceptions of ecological impacts at wilderness campsites. Final Report submitted to Wilderness Management Research Project, Intermountain Research Station, Missoula, MT. 146 p.

Shelby, B., T.A. Heberlein, J.J. Vaske, and G. Alfano. 1983. Expectations, preferences, and feeling crowded in recreation activities. Leisure Sciences 6(1): 1-14.

Shelby, B., and Thomas Heberlein. 1984. A conceptual framework for carrying capacity determination. Leisure Sciences 6(4): 433-451.

Shelby, B., and T.A. Heberlein. In Press. Social carrying capacity in recreation settings.

Stankey, George H. 1971. The perception of wilderness recreation carrying capacity: a geographic study in natural resources management. Unpublished Ph.D Dissertation. Michigan State University. 351 p.

Stankey, George H. 1971. Wilderness: carrying capacity and quality. Naturalist 22(3): 7-13.

Stankey, George H. 1972. A strategy for the definition and management of wilderness quality. In: Natural Environments: Studies in Theoretical and Applied Analysis, John V. Krutilla, ed. Baltimore: The John Hopkins University Press, p. 88-114.

Stankey, George H. 1973. Visitor perceptions of wilderness recreation carrying capacity. Research Paper INT-142. Ogden, UT: USDA Forest Service, Intermountain Research Station. 34 p.

Stankey, George H., Stephen F. McCool, and Gerald L. Stokes. 1984. Limits of Acceptable Change: A new framework for managing the Bob Marshall Wilderness Complex. Western Wildlands 10(3): 33-37.

Stankey, G.H., D.N. Cole, R.C. Lucas, M.E. Petersen, and S.S. Frissell. 1985. The Limits of Acceptable Change (LAC) system for wilderness planning. General Technical Report INT-176. Ogden, UT: USDA Forest Service, Intermountain Research Station. 37 p.

Stankey, George H., and Robert C. Lucas. 1986. Trends in backcountry and wilderness use: Is past prologue to future? Paper presented at the First National Symposium on Social Science in Resource Management, Oregon State University, Corvallis, OR. May 12-16, 1986. 40 p.

Teale, E.W. 1954. The Wilderness World of John Muir. Houghton-Mifflin Co., Boston.

Titre, J.P., and A.S. Mills. 1982. Effect of encounters on perceived crowding and satisfaction. In: Forest and River Recreation: Research Update. Proceedings from the Symposium on Leisure Research. Oct. 25-27, 1981. Minneapolis, Minn. University of Minnesota Agricultural Experiment Station. Miscellaneous Publication 18.

Vaske, J.J., A.R. Graefe, and A.B Dempster. 1982. Social and environmental influences on perceived crowding. In Proceedings: Wilderness Psychology Group Conference. pp. 211-227. Morgantown, WV.

Vaske, J.J., M.P. Donnelly, and T.A. Heberlein. 1980. Perceptions of crowding and resource quality by early and more recent visitors. Leisure Sciences 3(4): 367-381.

Washburne, Randel, and David N. Cole. 1983. Problems and practices in wilderness management: a survey of managers. Research Paper INT-304. Ogden, UT: USDA Forest Service, Intermountain Research Station. 56 p.

Womble, Peter, D. Johnson, G. Bultena, and D. Field. 1980. The response of hikers to seeing resource impacts in the backcountry. Final Report submitted to USDI Nat. Park Serv., in cooperation with the Cooperative Park Studies Unit, College of Forest Resources, Univ. of Washington, Seattle. 17 p.

Zuckert, Judith. 1980. Environmental and psychological determinants of campsite selection at a high Sierra lake. M.S. Thesis, Colorado State Univ., Fort Collins. 72 p.

APPENDIX A

Photographs of campsite illustrations found in separate binder

(on file, RWU 4901
Missoula FSL)

APPENDIX B

Visitor and Manager Questionnaires

A. You will be viewing slides of color illustrations depicting wilderness campsites. Please view each slide (slides will be advanced every 10 seconds) and rate each campsite on the basis of its condition. The campsite and its setting (background) will be the same in each slide, only the campsite conditions will be different. Please rate each slide in terms of the acceptability or desirability of its conditions, for you personally, as a wilderness campsite.

Slide #	desirable	acceptable but not desirable	unacceptable
1.	☐	☐	☐
2.	☐	☐	☐
3.	☐	☐	☐
4.	☐	☐	☐
5.	☐	☐	☐
6.	☐	☐	☐
7.	☐	☐	☐
8.	☐	☐	☐
9.	☐	☐	☐
10.	☐	☐	☐
11.	☐	☐	☐
12.	☐	☐	☐
13.	☐	☐	☐
14.	☐	☐	☐

B. In this section you will view two slides side by side. You will be shown a total of eighteen (18) pairs of slides in this manner. For each pair of slides viewed please choose which <u>one</u> of the two campsites depicted you would prefer to camp at while on a wilderness trip. The slide on the left will be slide "A"; the slide on the right will be slide "B". Please indicate the preferred campsite by circling either A or B.

1.	A	B	10.	A	B
2.	A	B	11.	A	B
3.	A	B	12.	A	B
4.	A	B	13.	A	B
5.	A	B	14.	A	B
6.	A	B	15.	A	B
7.	A	B	16.	A	B
8.	A	B	17.	A	B
9.	A	B	18.	A	B

C. Imagine yourself on a wilderness trip - you've been hiking or riding for several days and are now in the wilderness "interior". Please view these next nine (9) slides with this in mind and rate each campsite in terms of the acceptability or desirability of its <u>conditions</u>, for you personally, <u>in this particular context</u>.

<u>Slide #</u>

	desirable	acceptable but not desirable	unacceptable
1.	☐	☐	☐
2.	☐	☐	☐
3.	☐	☐	☐
4.	☐	☐	☐
5.	☐	☐	☐
6.	☐	☐	☐
7.	☐	☐	☐
8.	☐	☐	☐
9.	☐	☐	☐

D. Now imagine yourself on another wilderness trip. This time you are still on the first day of your trip, and are one day's hike or ride from the trailhead. Please view the next nine (9) slides with this in mind and rate each campsite in terms of the acceptability or desirability of its conditions, for you personally, in this particular context.

Slide #	desirable	acceptable but not desirable	unacceptable
1.	☐	☐	☐
2.	☐	☐	☐
3.	☐	☐	☐
4.	☐	☐	☐
5.	☐	☐	☐
6.	☐	☐	☐
7.	☐	☐	☐
8.	☐	☐	☐
9.	☐	☐	☐

E. In this last section you will be viewing fourteen (14) slides. For each slide, please choose the one word (from the list of five words provided below) that you feel best describes the amount of impact present at the depicted campsite.

Slide #	Severe	Heavy	Moderate	Minimal	None
1.	☐	☐	☐	☐	☐
2.	☐	☐	☐	☐	☐
3.	☐	☐	☐	☐	☐
4.	☐	☐	☐	☐	☐
5.	☐	☐	☐	☐	☐
6.	☐	☐	☐	☐	☐
7.	☐	☐	☐	☐	☐
8.	☐	☐	☐	☐	☐
9.	☐	☐	☐	☐	☐
10.	☐	☐	☐	☐	☐
11.	☐	☐	☐	☐	☐
12.	☐	☐	☐	☐	☐
13.	☐	☐	☐	☐	☐
14.	☐	☐	☐	☐	☐

F. Finally, we have a few questions about you which provide information useful in management. Remember, you will not be identified with your answers, so please be frank.

1. How many trips did you take in a Wilderness area in the past two years? _____

2. How many total days did you spend in Wilderness areas on all visits in the past two years?

☐ 0 - 5

☐ 6 - 10

☐ 11 - 20

☐ 21 - 40

☐ more than 40

F. (cont.)

3. How do you usually travel in the Wilderness - please indicate the way you travel most often?

- ☐ Hike, carrying our equipment ourselves
- ☐ Hike, leading horses or mules
- ☐ Horseback
- ☐ Other (describe _____)

4. Do you belong to any conservation or environmental groups?

- ☐ No
- ☐ Yes -- which ones? _____

_____

5. Do you hunt?

- ☐ No
- ☐ Yes -- Do you hunt in Wilderness areas?

  No

  Yes

6. On the following page is a list of statements. Please indicate the degree to which you agree or disagree with each of the statements.

	strongly agree	agree	neutral	disagree	strongly disagree
A. I think man-made features (except for trails) should be <u>completely</u> absent from wilderness areas.	☐	☐	☐	☐	☐
B. I don't see anything wrong with small, man-made <u>earthen</u> dams in wilderness areas.	☐	☐	☐	☐	☐
C. I don't think even the most <u>primitive</u> roads should be present in wilderness areas.	☐	☐	☐	☐	☐
D. I don't think any type of permanent or semi-permanent backcountry shelters should be present in wilderness areas.	☐	☐	☐	☐	☐
E. I don't see anything wrong with stocking game animals in wilderness areas.	☐	☐	☐	☐	☐
F. I think it's okay to have campsites with plank tables, primitive outhouses, and fireplaces with metal grates in a wilderness area.	☐	☐	☐	☐	☐
G. When I go into a wilderness area I don't want to see <u>anyone</u> else except the people I'm with.	☐	☐	☐	☐	☐
H. I think that under certain circumstances motorized or mechanized travel <u>could</u> be permitted in wilderness areas.	☐	☐	☐	☐	☐
I. I don't see anything wrong with stocking fish in the lakes and streams of wilderness areas.	☐	☐	☐	☐	☐
J. It really bothers me to see evidence of previous visitors when I go into a wilderness area.	☐	☐	☐	☐	☐

Thank you for taking the time to participate in this study. It is our hope that knowledge gained from this study will help us better manage our wilderness areas.

University of Montana, School of Forestry

Intermountain Research Station
U.S. Dept. of Agriculture, Forest Service

A. You will be viewing slides of color illustrations depicting wilderness campsites. In this first section you will view two slides side by side. You will be shown four (4) pairs of slides in this manner. For each pair of slides viewed please choose which one of the two campsites depicted you would prefer to camp at while on a wilderness trip. The slide on the left will be slide "A"; the slide on the right will be slide "B". Please indicate the preferred campsite by circling either A or B.

1. A B

2. A B

3. A B

4. A B

B. In this section you will see fourteen (14) slides. The slides will be advanced about every ten (10) seconds. Please view each slide and rate each campsite on the basis of its condition. The campsite and its setting (background) will be the same in each slide, only the campsite conditions will be different. Please rate each slide in terms of the acceptability or desirability of its conditions, for you personally, as a wilderness campsite.

Slide #	desirable	acceptable but not desirable	unacceptable
1.	☐	☐	☐
2.	☐	☐	☐
3.	☐	☐	☐
4.	☐	☐	☐
5.	☐	☐	☐
6.	☐	☐	☐
7.	☐	☐	☐
8.	☐	☐	☐
9.	☐	☐	☐
10.	☐	☐	☐
11.	☐	☐	☐
12.	☐	☐	☐
13.	☐	☐	☐
14.	☐	☐	☐

C. In this section you will again view two slides side by side. There will be nine (9) pairs of slides shown. For each pair of slides simply choose which one of the two campsites depicted you would prefer to camp at while on a wilderness trip. The slide on the left will be slide "A"; the slide on the right will be slide "B". Please indicate the preferred campsite by circling either A or B.

1. A B
2. A B
3. A B
4. A B
5. A B
6. A B
7. A B
8. A B
9. A B

D. Imagine yourself on a wilderness trip - you've been hiking or riding for several days and are now in the wilderness "interior". Please view these next four (4) slides with this in mind and rate each campsite in terms of the acceptability or desirability of its conditions, for you personally, in this particular context.

Slide #	desirable	acceptable but not desirable	unacceptable
1.	☐	☐	☐
2.	☐	☐	☐
3.	☐	☐	☐
4.	☐	☐	☐

E. Now imagine yourself on another wilderness trip. This time you are still on the first day of your trip, and are one day's hike or ride from the trailhead. Please view the next four (4) slides with this in mind and rate each campsite in terms of the acceptability or desirability of its conditions, for you personally, in this particular context.

Slide #	desirable	acceptable but not desirable	unacceptable
1.	☐	☐	☐
2.	☐	☐	☐
3.	☐	☐	☐
4.	☐	☐	☐

F. Finally, we have a few questions about you which provide information useful in management. Remember, you will not be identified with your answers, so please be frank.

1. How many trips did you take in a Wilderness in the past two years? _____

2. How many total days did you spend in Wilderness areas on all visits in the past two years?

☐ 0 - 5

☐ 6 - 10

☐ 11 - 20

☐ 21 - 40

☐ more than 40

F. (cont.)

3. How do you usually travel in the Wilderness - please indicate the way you travel most often?

- ☐ Hike, carrying our equipment ourselves
- ☐ Hike, leading horses or mules
- ☐ Horseback
- ☐ Other (describe _____)

4. Do you belong to any conservation or environmental groups?

- ☐ No
- ☐ Yes -- which ones? _____

_____

5. Do you hunt?

- ☐ No
- ☐ Yes -- Do you hunt in Wilderness areas?

  No

  Yes

6. On the following page is a list of statements. Please indicate the degree to which you agree or disagree with each of the statements.

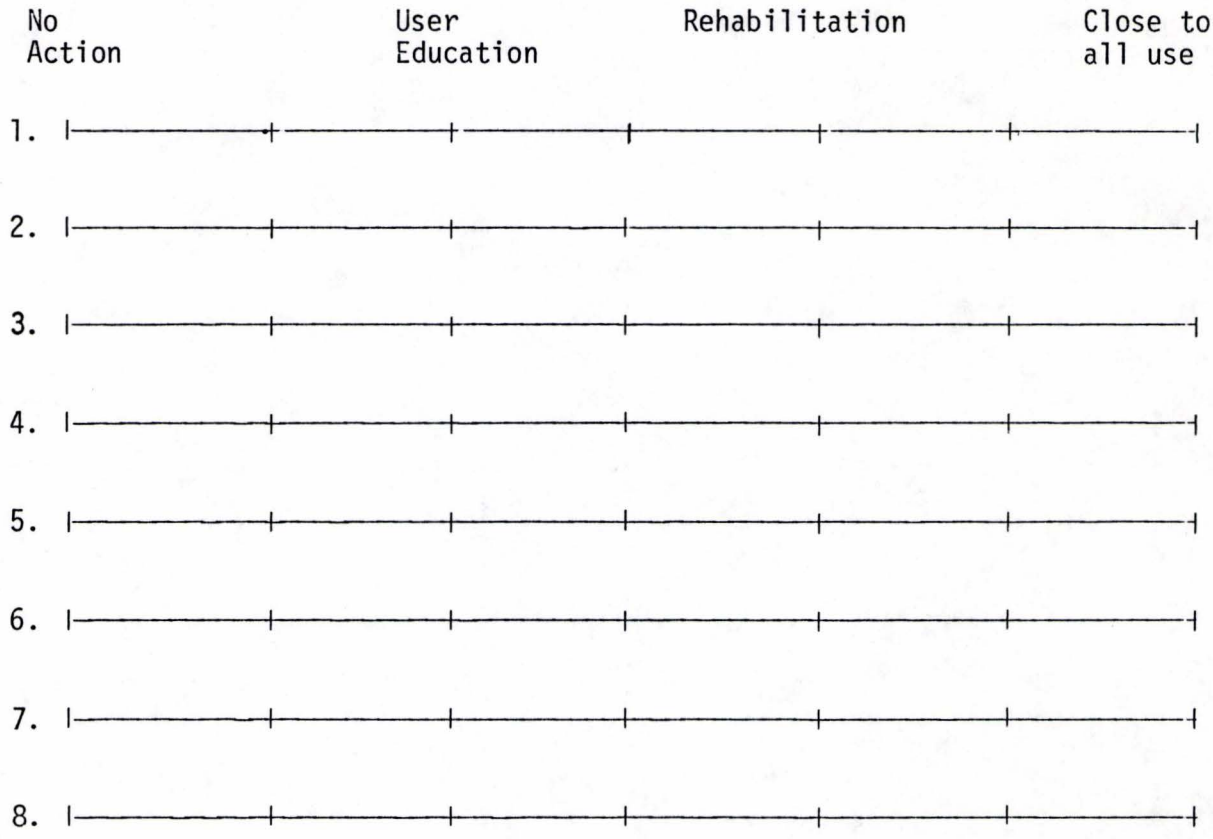
	strongly agree	agree	neutral	disagree	strongly disagree
A. I think man-made features (except for trails) should be <u>completely</u> absent from wilderness areas.	☐	☐	☐	☐	☐
B. I don't see anything wrong with small, man-made <u>earthen</u> dams in wilderness areas.	☐	☐	☐	☐	☐
C. I don't think even the most <u>primitive</u> roads should be present in wilderness areas.	☐	☐	☐	☐	☐
D. I don't think any type of permanent or semi-permanent backcountry shelters should be present in wilderness areas.	☐	☐	☐	☐	☐
E. I don't see anything wrong with stocking game animals in wilderness areas.	☐	☐	☐	☐	☐
F. I think it's okay to have campsites with plank tables, primitive outhouses, and fireplaces with metal grates in a wilderness area.	☐	☐	☐	☐	☐
G. When I go into a wilderness area I don't want to see <u>anyone</u> else except the people I'm with.	☐	☐	☐	☐	☐
H. I think that under certain circumstances motorized or mechanized travel <u>could</u> be permitted in wilderness areas.	☐	☐	☐	☐	☐
I. I don't see anything wrong with stocking fish in the lakes and streams of wilderness areas.	☐	☐	☐	☐	☐
J. It really bothers me to see evidence of previous visitors when I go into a wilderness area.	☐	☐	☐	☐	☐

Thank you for taking the time to participate in this study. It is our hope that knowledge gained from this study will help us better manage our wilderness areas.

University of Montana, School of Forestry

Intermountain Research Station
U.S. Dept. of Agriculture, Forest Service

A. What management strategy or action would you recommend for the following campsites? All of the campsites are used only by backpackers, and are on the way to, but not at, a popular destination in the wilderness.



B. In this section you will see fourteen (14) slides. The slides will be advanced about every ten (10) seconds. Please view each slide and rate each campsite on the basis of its condition. The campsite and its setting (background) will be the same in each slide, only the campsite conditions will be different. Please rate each slide in terms of the acceptability or desirability of its conditions, for you personally, as a wilderness campsite.

Slide #	desirable	acceptable but not desirable	unacceptable
1.	☐	☐	☐
2.	☐	☐	☐
3.	☐	☐	☐
4.	☐	☐	☐
5.	☐	☐	☐
6.	☐	☐	☐
7.	☐	☐	☐
8.	☐	☐	☐
9.	☐	☐	☐
10.	☐	☐	☐
11.	☐	☐	☐
12.	☐	☐	☐
13.	☐	☐	☐
14.	☐	☐	☐

C. These next four slides are of campsites in the wilderness 'interior' - several days hike or ride from the trailhead. With this in mind, please view these slides and rate each campsite in terms of the acceptability or desirability of its conditions, for you personally, in this particular context.

Slide #	desirable	acceptable but not desirable	unacceptable
1.	☐	☐	☐
2.	☐	☐	☐
3.	☐	☐	☐
4.	☐	☐	☐

D. Now imagine these next four campsites as being only one day's hike or ride from the trailhead - on the wilderness periphery. With this in mind, please view these slides and rate each campsite in terms of the acceptability or desirability of its conditions, for you personally, in this particular context.

Slide #	desirable	acceptable but not desirable	unacceptable
1.	☐	☐	☐
2.	☐	☐	☐
3.	☐	☐	☐
4.	☐	☐	☐

E. In this last section you will be viewing fourteen (14) slides. For each slide, please choose the one word (from the list of five words provided below) that you feel best describes the amount of impact present at the depicted campsite.

Slide #	Severe	Heavy	Moderate	Minimal	None
1.	☐	☐	☐	☐	☐
2.	☐	☐	☐	☐	☐
3.	☐	☐	☐	☐	☐
4.	☐	☐	☐	☐	☐
5.	☐	☐	☐	☐	☐
6.	☐	☐	☐	☐	☐
7.	☐	☐	☐	☐	☐
8.	☐	☐	☐	☐	☐
9.	☐	☐	☐	☐	☐
10.	☐	☐	☐	☐	☐
11.	☐	☐	☐	☐	☐
12.	☐	☐	☐	☐	☐
13.	☐	☐	☐	☐	☐
14.	☐	☐	☐	☐	☐

F. Finally, we have a few questions about you which provide information useful in management. Remember, you will not be identified with your answers, so please be frank.

1. How many trips did you take in a Wilderness area in the past two years? _____

2. How many total days did you spend in Wilderness areas on all visits in the past two years?

☐ 0 - 5

☐ 6 - 10

☐ 11 - 20

☐ 21 - 40

☐ more than 40

F. (cont.)

3. How do you usually travel in the Wilderness - please indicate the way you travel most often?

- ☐ Hike, carrying our equipment ourselves
- ☐ Hike, leading horses or mules
- ☐ Horseback
- ☐ Other (describe _____)

4. Do you belong to any conservation or environmental groups?

- ☐ No
- ☐ Yes -- which ones? _____

_____

5. Do you hunt?

- ☐ No
- ☐ Yes -- Do you hunt in Wilderness areas?

  No

  Yes

6. On the following page is a list of statements. Please indicate the degree to which you agree or disagree with each of the statements.

	strongly agree	agree	neutral	disagree	strongly disagree
A. I think man-made features (except for trails) should be <u>completely</u> absent from wilderness areas.	☐	☐	☐	☐	☐
B. I don't see anything wrong with small, man-made <u>earthen</u> dams in wilderness areas.	☐	☐	☐	☐	☐
C. I don't think even the most <u>primitive</u> roads should be present in wilderness areas.	☐	☐	☐	☐	☐
D. I don't think any type of permanent or semi-permanent backcountry shelters should be present in wilderness areas.	☐	☐	☐	☐	☐
E. I don't see anything wrong with stocking game animals in wilderness areas.	☐	☐	☐	☐	☐
F. I think it's okay to have campsites with plank tables, primitive outhouses, and fireplaces with metal grates in a wilderness area.	☐	☐	☐	☐	☐
G. When I go into a wilderness area I don't want to see <u>anyone</u> else except the people I'm with.	☐	☐	☐	☐	☐
H. I think that under certain circumstances motorized or mechanized travel <u>could</u> be permitted in wilderness areas.	☐	☐	☐	☐	☐
I. I don't see anything wrong with stocking fish in the lakes and streams of wilderness areas.	☐	☐	☐	☐	☐
J. It really bothers me to see evidence of previous visitors when I go into a wilderness area.	☐	☐	☐	☐	☐

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Appendix C

	Factor 1	Factor 2	Factor 3
Game	.8171		
Fish	.8058		
Dams	.4937		
Shelters		.7743	
Roads		.7312	
Campsites		.4527	
Motors		.3835	
Solitude			.7593
Evidence			.6531
Man-Features			.5855

Factors and factor-loadings for
Wilderness Purism scale items.

Appendix D

	Factor 1	Factor 2	Factor 3	Factor 4
heavy FR	.8662			
mod. FR	.8481			
severe FR	.7249			
mult. FR	.7149			
min. FR	.6715			
min. TD		.8660		
mod. TD		.8547		
pristine		.8374		
mod. BG			.8384	
heavy BG			.7817	
severe BG			.6703	
min. BG			.5186	
severe TD				.8736
heavy TD				.7564

min. = minimal
mod. = moderate
mult. = multiple
FR = fire ring impact
TD = tree damage impact
BG = bare ground impact

Factors and factor-loadings for campsite impact acceptability ratings.

	Wilderness Interior	Wilderness Periphery
Bare Ground	minimal	moderate
Tree Damage	moderate	heavy
Fire Ring	minimal	heavy

Appendix E

Potential standards for three wilderness campsite impacts based on visitor perceptions.